Digitized by the Internet Archive
in 2013

http://archive.org/details/transactionsstud5119coll

TRANSACTIONS & STUDIES

of

THE COLLEGE OF PHYSICIANS
OF PHILADELPHIA

MEDICINE & HISTORY

Series V · Volume I Nº 1 · March 1979

Copyright© 1979 by The College of Physicians of Philadelphia
Printed by The Winchell Company, Philadelphia, Pennsylvania
ISSN 0010-1087

SAUL JARCHO, *CONSULTING EDITOR IN CHIEF*

RONALD F. KOTRC, *EDITOR*

EDITORIAL COMMITTEE, COLLEGE OF PHYSICIANS

ROBERT AUSTRIAN
SAUL JARCHO
FRED B. ROGERS
JONATHAN E. RHOADS

ADVISORY EDITORIAL BOARD

WHITFIELD J. BELL, JR.
JOHN B. BLAKE
GERT H. BRIEGER
CHESTER BURNS
LLOYD G. STEVENSON
DORA B. WEINER
LEONARD G. WILSON
JAMES HARVEY YOUNG

WILLIAM F. CHAVEAS, *MANAGING EDITOR*

ALBERTA D. BERTON, *PRODUCTION MANAGER*

The College of Physicians of Philadelphia does not assume responsibility for statements or views expressed by contributors to the *Transactions and Studies*. All material submitted for publication in the journal is subject to editorial review. Editorial correspondence and manuscripts (typewritten, text and footnotes double spaced, original and two duplicates) should be sent to Ronald F. Kotrc, Editor, Francis C. Wood Institute for the History of Medicine, College of Physicians of Philadelphia, 19 South 22nd Street, Philadelphia, PA 19103. When preparing manuscripts for publication, contributors should consult *A Manual of Style* published by the University of Chicago Press. Slight variations will be observed in the text of this journal.

The *Transactions and Studies of the College of Physicians of Philadelphia* is published four times a year (March, June, September, December) at Philadelphia, PA, by the College of Physicians of Philadelphia. Publication Office: The College of Physicians of Philadelphia, 19 South 22nd Street, Philadelphia, PA 19103. Second-class postage paid at Philadelphia, Pennsylvania 19103. Printed in U.S.A.
Copyright 1979, all rights reserved.

Subscription correspondence should be sent to Alberta D. Berton, Director, Medical Documentation Service, The College of Physicians of Philadelphia, 19 South 22nd Street, Philadelphia, PA 19103. Subscriptions, U.S.A. and Canada $24.00, foreign $28.00. Single copies, $7.50.

The *Transactions and Studies of the College of Physicians of Philadelphia* is indexed in *Biological Abstracts, Chemical Abstracts* and *Index Medicus*.

TRANSACTIONS & STUDIES
OF
THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

Series V Volume I Number 1 March 1979

MEDICINE AND HISTORY

"Even to a Sucking Infant": Nostrums and Children
The Samuel X Radbill Lecture for 1978
JAMES HARVEY YOUNG 5

Maturation Age of the Growing Child in Relation to the Timing of Statural and Facial Growth at Puberty
WILTON MARION KROGMAN 33

Medicine and Surgery as Art or Craft: The Role of Schematic Literature in the Separation of Medicine and Surgery in the Late Middle Ages
DARREL W. AMUNDSEN 43

The Case of the Quarrelsome Watchmen
THOMAS R. FORBES and JOAN L. VENES 58

Dwarfism and Cervical Rib in an Anglo-Saxon from Jarrow Monastery
CALVIN WELLS 62

ESSAY-REVIEW
HARLAN LANE. *The Wild Boy of Aveyron.*
Reviewed by Dora B. Weiner 67

MEMOIRS
J. Montgomery Deaver (1901-1978)
JONATHAN E. RHOADS 75

M. Louise C. Gloeckner (1904-1978)
KATHARINE R. STURGIS 78

Harry P. Schenck (1894-1978)
JAMES B. SNOW, JR. 80

THE CONTRIBUTORS

DARREL W. AMUNDSEN is Professor of Classics in the Foreign Languages Department, Western Washington University, Bellingham, Washington 98225.

THOMAS R. FORBES, Ph.D., is Professor of Anatomy in the Section of Gross Anatomy, Department of Surgery, Yale University School of Medicine, New Haven, Connecticut 06510.

WILTON MARION KROGMAN, Ph.D., D.Sc., F.A.C.D. (Hon.) is Chief of Research, Lancaster Cleft Palate Clinic, 24 North Lime Street, Lancaster, Pennsylvania 17602.

JOAN L. VENES, M.D., is Associate Professor of Neurosurgery in the Department of Surgery, Yale University School of Medicine, New Haven, Connecticut 06510.

DORA B. WEINER, Ph.D., is Professor of History at Manhattanville College, Purchase, New York 10577.

CALVIN WELLS, F.R.A.I., Ph.D., M.R.C.S., L.R.C.P. (Deceased) was at the Castle Museum, Norwich, England.

JAMES HARVEY YOUNG, Ph.D., is Professor of History in the Department of History, Emory University, Atlanta, Georgia 30322.

TRANSACTIONS & STUDIES
OF
THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

Series V Volume I Number 2 June 1979

MEDICINE AND HISTORY

Quo Vadis Collegium?
JOHN P. HUBBARD 83

The Assessment of Technology in Medical Care:
Recent Developments
SEYMOUR PERRY 96

Exposure to Lead in Ancient Populations
TONY WALDRON and CALVIN WELLS 102

Making Therapeutic Decisions with Protopharmacologic
Evidence
J. WORTH ESTES 116

William T. Bovie, Inventor and Teacher
WILLIAM K. BEATTY 138

The Siamese Twins of Santo Domingo
SAUL JARCHO 145

Gonorrhea: CDC Recommended Treatment Schedules, 1978
U.S. DEPARTMENT OF HEALTH, EDUCATION
AND WELFARE, CENTER FOR DISEASE CONTROL 148

MEMOIRS
Donald L. Baxter (1927-1979)
WILLIAM F. CHAVEAS 157

Wilbur Emory Burnett (1898-1979)
GEORGE P. ROSEMOND 159

THE CONTRIBUTORS

WILLIAM K. BEATTY is Professor of Medical Bibliography at Northwestern University Medical School, 303 East Chicago Avenue, Chicago, IL 60611.

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE, Public Health Service, Center for Disease Control, Atlanta, GA 30333. The article on CDC Recommended Treatment Schedules for Gonorrhea (1978) was submitted by Ronald K. St. John, M.D., Deputy Director, Venereal Disease Control Division, Bureau of State Services.

J. WORTH ESTES, M.D., is Associate Professor in the Department of Pharmacology and Experimental Therapeutics at the School of Medicine, Boston University Medical Center, 80 East Concord Street, Boston, MA 02118.

JOHN P. HUBBARD, M.D., is Past President of the College of Physicians of Philadelphia and President Emeritus of the National Board of Medical Examiners. His address is 829 Black Rock Road, Gladwyne, PA 19035.

SAUL JARCHO, M.D., is Consulting Editor in Chief of *Transactions & Studies* and former Editor in Chief of the *Bulletin of the New York Academy of Medicine*.

SEYMOUR PERRY, M.D., is Associate Director for Medical Application of Research, National Institutes of Health, and Acting Director, National Center for Health Care Technology, Office of the Assistant Secretary for Health, Department of Health, Education, and Welfare.

H.A. (Tony) WALDRON, M.D., is at the London School of Hygiene and Tropical Medicine, Gower Street, London WC 1E 7HT, England.

CALVIN WELLS, Ph.D., F.R.A.I., M.R.C.S., L.R.C.P., (Deceased) was at the Castle Museum, Norwich, England.

TRANSACTIONS & STUDIES
OF
THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

Series V Volume I Number 3 September 1979

MEDICINE AND HISTORY

The History of the Drug Treatment of Mental Diseases
ERWIN H. ACKERKNECHT 161

The History of the Brompton Hospital
P. J. BISHOP 171

Galen *On Tremor, Palpitation, Spasm, and Rigor*
Galeni *De tremore, palpitatione, convulsione, et rigore*
DAVID SIDER and MICHAEL McVAUGH 183

The Legacy of Carl Jung
FRED B. ROGERS 211

Studies on Hippocrates and Galen in Modern Spain
LUIS GARCÍA-BALLESTER 215

MEMOIRS

Gonzalo Enrique Aponte (1929-1979)
WILLIAM F. KELLOW, M.D. 230

Charles C. Chapple (1903-1979)
JEAN A. CORTNER, M.D. 232

John Vernon Ellson (1898-1979)
LAWRENCE S. CAREY, M.D. 234

Robert Henry Ivy (1881-1974)
HENRY P. ROYSTER, M.D. 236

Herndon Briggs Lehr (1923-1979)
WILLIAM T. FITTS, M.D. 238

Francis D. W. Lukens (1899-1978)
ALBERT I. WINEGRAD, M.D. 241

Michael Scott (1906-1979)
GEORGE P. ROSEMOND, M.D. 244

THE CONTRIBUTORS

ERWIN H. ACKERKNECT, M.D., is Professor of the History of Medicine at the University of Zurich, Zurich, Switzerland.

P. J. BISHOP is Librarian, Cardiothoracic Institute, Brompton, London, England.

LUIS GARCÍA-BALLESTER, M.D., is Professor of the History of Medicine, Faculty of Medicine, University of Granada, Granada, Spain.

MICHAEL McVAUGH, Ph.D., is Professor of History, Department of History, University of North Carolina at Chapel Hill, Chapel Hill, NC 27514.

FRED B. ROGERS, M.D., is Professor of Family Practice and Community Health, Temple University School of Medicine, Philadelphia, PA 19140.

DAVID SIDER, Ph.D., lives at 3873 Orloff Avenue, Bronx, NY 10463.

TRANSACTIONS & STUDIES
OF
THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

Series V Volume I Number 4 December 1979

MEDICINE AND HISTORY

American Medicine in the Twentieth Century:
Some Personal Insights
The Kate Hurd Mead Lecture for 1979
CAROLINE BEDELL THOMAS 247

A Bibliography of the Galenic Corpus
A Newly Researched List and Arrangement of the Titles
of the Treatises Extant in Greek, Latin, and Arabic
RONALD F. KOTRC and K. R. WALTERS 256

Collecting Medical Books: Practical and Theoretical
Considerations with an Annotated Bibliography
W. BRUCE FYE 305

Letter to the Editor:
A Reply to Miller's "The Habit of Sherlock Holmes"
DAVID M. GRILLY 324

MEMOIRS
Abraham Cantarow (1901-1979)
BENJAMIN HASKELL, M.D. 328

John Bernard Flick (1893-1979)
ORVILLE C. KING, M.D. 330

THE CONTRIBUTORS

W. BRUCE FYE, M.A., M.D., is Adjunct Assistant Professor of the History of Medicine at the University of Wisconsin Center for Health Sciences and Cardiologist at the Marshfield Clinic, 1000 North Oak Avenue, Marshfield, WI 54449.

DAVID M. GRILLY, Ph.D., is Associate Professor in the Department of Psychology, Cleveland State University, Cleveland, OH 44115.

RONALD F. KOTRC, Ph.D., is the Director of the Francis C. Wood Institute for the History of Medicine at the College of Physicians of Philadelphia, 19 South 22nd Street, Philadelphia, PA 19103 and Associate Professor of the History of Medicine at Thomas Jefferson University, Philadelphia.

CAROLINE BEDELL THOMAS, M.D., is Professor Emeritus of Medicine at the Johns Hopkins University School of Medicine and Director of the Precursors Study, 725 North Wolfe Street, Baltimore, MD 21205.

K. R. WALTERS, Ph.D., is Assistant Professor of Classics in the Department of Greek and Latin, Wayne State University, Detroit, MI 48202.

"Even to a Sucking Infant": Nostrums and Children

JAMES HARVEY YOUNG

THE SAMUEL X RADBILL LECTURE

ON August 17, 1731, the widow Sarah Read placed an advertisement in her son-in-law's newspaper, the *Pennsylvania Gazette*. She had just changed the place of marketing for both her Family Salve and her "well-known Ointment for the ITCH," which in years past had cured countless Philadelphians. The Ointment, she added, "is always effectual . . . , and never fails to perform the Cure speedily. It also kills or drives away all Sorts of Lice . . . . It has no offensive Smell, but rather a pleasant one; and may be used without the least Apprehension of Danger, even to a sucking Infant."

The advertising of made-in-America nostrums was rare during the colonial period, so, in moving her ointments from the realm of folk medicine into the channels of commerce, the widow Read exhibited some of that venturesomeness for which Benjamin Franklin was to become a model for generations of American children.[1] In choosing the claims to be made for her ointments, Sarah Read came toward the beginning of a mainline American patent-medicine tradition. She determined to promote her remedies, as many of her successors were to do, for all members of the family. And to make the point clear with respect to that age group about whom there might be the most doubt, she deliberately wrote into her advertisement the words, "even to a sucking Infant."

Toward the close of the colonial years a few other American promoters followed Sarah Read's total-family pitch. A New York merchant advertised a remedy, purportedly the formula of an apothecary of the Philadelphia Hospital, claiming that it "cures the bloody flux [for one and all] . . . and is a most excellent medicine to quiet forward children, and make them healthy."[2] And to build support for Speaight's Worm-Destroying Pills, made by an apothecary in Poughkeepsie, an advertisement warned gloomily: "So pernicious are these vermin, that there is scarce any age, sex, or constitution, but they are subject to

---

Delivered before the Section on Medical History at The College of Physicians of Philadelphia, March 15, 1978.

1. C.E. Strickland, "Children, American Attitudes Toward," *The Encyclopedia of Education.* 10 vols. L.C. Deighton, ed. (1971) 2:83-84.

2. John Holt advertisement, *New York Journal,* Supplement, June 14, 1774.

them, nor any part of us but they affect." This last assertion the advertisement sought to demonstrate by theory both ingenious and alarming.[3]

The dominant force in commercial self-treatment among American colonials, however, lay not with the occasional nostrum surfacing in Philadelphia or Poughkeepsie, but rather with the vast tide of patent medicines flowing from the mother country to every colony on almost every ship. Certainly by the middle of the eighteenth century, any adult American living near a town could not help but be aware of the distinctively shaped bottles and the oval pill boxes for sale by druggist and grocer, bookseller and printer. Several dozen of the more than two hundred British brands reached the colonial market. It would have been difficult for colonial citizens to know which of the British medicines truly were patented and which were not; all packaged medicines came to be called "patent medicines" in common parlance. In British newspapers flamboyant advertising prevailed, but in the smaller American press seldom did ingenuity go beyond a mere listing of brands available. Printed wrappers that encompassed the vials and boxes made up to some extent for advertising reticence by asserting bold therapeutic claims and flaunting boastful testimonials. So popular did these British medicines become that, when trade restraints curtailed the supply as the Revolution approached, American apothecaries collected empty bottles, filled them, wrapped them, and sold them to eager customers.[4]

Compared with the simplicity of American nostrums, the greater number of British medicines and the greater sophistication of their promotion led to a more abundant variety of purported therapies. Although many of the imported patent medicines bore claims of effectiveness for treating most ailments in all people, other British medicines claimed a measure of specialization. The wrapper of Hooper's Female Pills, for example, did *not* assert: give them to your baby. Other nostrums, while trying to avoid too narrow a market, in fact came to be used most particularly for children. This was true of Dalby's Carminative and Godfrey's Cordial.

The year after Franklin's paper ran his mother-in-law's advertisement, the *Gazette* sold space to a Philadelphia marketer of Dr. Godfrey's General Cordial.[5] At this date not much age restraint had as yet appeared. The Cordial is "universally approved of for the Cholick, and all Manner of Pains in the Bowels, Fluxes, Fevers, Small-Pox, Measles, Rheumatism, Coughs, Colds, and Restlessness in Men, Women, and Children; and particularly for several Ailments incident to Child-Bearing Women and Relief of young Children in

3. Speaight's advertisement, *New York Journal,* Sept. 19, 1771.

4. G.B. Griffenhagen and J.H. Young, "Old English Patent Medicines in America," *Contributions from the Museum of History and Technology.* U.S. National Museum Bulletin 218 (Washington: Smithsonian Institution, 1959) 155-183.

5. Samuel Emlen advertisement, *Pennsylvania Gazette,* June 26, 1732.

breeding their Teeth." As time passed, the more sweeping indications shrank into the background and the claims of value for babies at the teething stage came to the fore. Dalby's Carminative followed a similar pattern.[6]

In the course of this transition, it must be said, both Godfrey's and Dalby's remedies, as well as the other British patent medicines most popular in the colonies, underwent a change of status. During the Revolution American imitations had seized the market, and after the war the British nostrum makers could not win it back. What had been proprietary became generic. The bottles retained their traditional shapes but nobody could guess what a multitude of American marketers was pouring into them. Indeed, the problem seemed so urgent that the first major task undertaken, in 1824, by the newly organized Philadelphia College of Pharmacy was to figure out and publicize the "most appropriate" formulas for eight of the most popular of these old British patent medicines.[7]

Godfrey's Cordial and Dalby's Carminative were numbered among these eight. Because the dosing of children had now come to be the chief use of these preparations, the Philadelphia committee hoped to reduce what they deemed a "dangerous opium variance" among the assorted bottles of these medicines. "Medicine would be a one-armed man," Thomas Sydenham had said, "if it did not possess" opium.[8] And opium was one of the few drugs which later Oliver Wendell Holmes would not wish to cast into the sea.[9] Not surprisingly, opium was a principal ingredient in patent medicines. Although the scope and nature of the danger were not yet fully recognized, sensitive physicians and pharmacists realized the need for caution. The Philadelphia committee decided that in a proper dose of Godfrey's Cordial for a child, the opium should be one-twelfth part of a grain. Besides the opium, the Cordial should contain oil of sassafras and potassium carbonate mixed in molasses and water. Besides the opium in Dalby's mixture, the committee specified several carminative and laxative botanicals, suggesting also that some much-used ones should be omitted.

In time both mixtures found their way into the *National Formulary,* although not under their proprietary names,[10] while the generic forms, retaining their original cognomina, flourished well into the twentieth century. Apprentice

---

6. Dalby's Carminative advertisement, *Daily Advertiser* (London), Jan. 4, 1781.

7. Philadelphia College of Pharmacy, *Formulae for the Preparation of Eight Patent Medicines* (Philadelphia, 1824).

8. C.H. LaWall, *Four Thousand Years of Pharmacy* (Philadelphia, 1927) 281.

9. O.W. Holmes, *Medical Essays* (Boston, 1891) 202-203.

10. J.P. Street, *The Composition of Certain Patent and Proprietary Medicines* (Chicago, 1917) 70, 101.

pharmacists cut their professional teeth by mixing in empty alcohol barrels huge batches of the old English nostrums to be vended in vials of the traditional shapes.[11]

But by becoming generics, the British patent medicines had been replaced in the proprietary market by a bold, brash breed of American brands. Spurred first by the cultural nationalism of the Revolutionary generation, then nourished by various forces linked to Jacksonian democracy, American patent medicines in the independent nation more than made up for their slow start of colonial days.[12]

Certainly throughout the nineteenth century the widow Read had many followers who recommended their nostrums as valuable to a wide range of ages.

Figure 1. The baby who needs a vermifuge has an older face than does his mother. Prints and Photographs Division, Library of Congress, Washington, D.C.

---

11. J.W. Forbes, "The Memoirs of an American Pharmacist," *Midland Druggist and Pharmaceutical Review* 40 (1911): 389.

12. J.H. Young, *The Toadstool Millionaires* (Princeton, 1961) 16-89.

Major proprietors like Thomas Dyott and later David Jayne of Philadelphia marketed a broad assortment of Family Medicines, usually including an antibilious pill, a stomach remedy, a vermifuge, a nerve calmer, rheumatic drops, an itch ointment, a toothache remedy, and a healing plaster.[13] All members of the family were guaranteed therapeutic coverage. As the faces of children in folk art of the period suggest, childhood was not considered to be so separate a stage of life as observers would later deem it to be. In a lithograph of 1857 promoting Kemp's Vegetable Pastilles "for expelling Worms from the System," the face of the baby looks even older than the face of the mother on whose lap he sits (Figure 1).[14] This perspective on children perhaps made it plausible that grandparents and grandchildren be dosed from the same bottles.

The tradition of an appeal to all ages persisted into the later day when both a sentimentalizing of childhood and a revolution in graphics led to an outpouring of trade cards printed in color. This medium reveals, a thousand times over, coy and cute children going about their business, whatever it might happen to be, while beseeching adults, with varying degrees of subtlety, to protect or to recover the health of both themselves and the children by the use of various nostrums.

A prolific purveyor of such trade cards was James Cook Ayer. Although his advertising humorously pretended more remote origins, Ayer got his start by working at an apothecary shop in Lowell, Massachusetts. He studied medicine with a local physician, bought a drug store in 1841, and eventually received a medical degree from the University of Pennsylvania. About midcentury Ayer marketed a Cherry Pectoral, following it with other proprietaries.[15] He and his brother Frederick, who succeeded him as head of the firm, held high rank among the nation's leading advertisers and expanded internationally as well.[16]

Ayer trade cards showed naked babies packaging Cathartic Pills, "a safe pleasant and reliable Family Medicine."[17] Through a sequence of other cards, babies grew into young adults (Figure 2-6). Occasionally the cards show youngsters in close association with bottle or pill-box, but mainly the relation is

---

13. Dyott advertisement, *Aurora General Advertiser* (Philadelphia), Jan. 3, 1821.

14. Kemp's Vegetable Pastilles poster (1857). Prints and Photographs Division, Library of Congress.

15. F.W. Coburn, "Ayer, James Cook," *Dictionary of American Biography.* 20 vols. Allen Johnson and Dumas Malone, eds., 1:450-451.

16. Anonymous, "Ayer's Death Recalls Palmy Patent Medicine Days," *Printers' Ink* 102 (March 21, 1918): 58, 60.

17. Ayer trade card slide collection, donated by John Spaulding King, Jr., Edward G. Miner Library, School of Medicine and Dentistry, University of Rochester. All figures referred to in this paragraph are in this collection.

Figure 2. Promoters of Family Medicines often put heavy stress on the children's end of the age spectrum. John Spaulding King, Jr., Collection, Edward G. Miner Library, School of Medicine and Dentistry, University of Rochester, Rochester, N.Y.

pictorially remote. The Ayers seemed to prefer girls to boys. Few words accompany the picture — although the reverse of the cards makes a harder sell — but the words have therapeutic import. The Cherry Pectoral "Cures Coughs, Colds, Asthma, Croup, Bronchitis, Whooping-Cough, and Consumption." The Sarsaparilla is "a safe and reliable Blood Purifier, peculiarly adapted to children." "Health and Happiness" result from its use. Sickness absents itself from trade-card pictures. Children are obviously buoyant because they faithfully use the Ayer medicines. "How fair she grows from day to day," the legend under one charming portrait, links closely with the nearby claims, "Purifies the Blood. Improves the Complexion. Makes the Weak Strong."

Ayer did not monopolize the scheme of focusing on children in Family Medicine advertising. The technique spread far and wide. An early trade card shows a boy benefitting from Henry's Carbolic Salve, and also reflects a type of crude racial humor found elsewhere in patent medicine promotion of the period.[18] Hood's medicines, like Ayer's, played the juvenile game.[19] Scott's Emulsion of Cod-liver Oil and Hypophosphites nourished boys and girls, as well as adults, helping throat and lung ailments and anemia (Figure 7).[20] And

18. Henry's Carbolic Salve trade card. Edward C. Atwater Collection, Rochester, New York.

19. Hood's Sarsaparilla calendar (1893). Atwater Collection. Hood's Vegetable Pills trade card. Author's collection.

20. Scott's Emulsion trade cards. Atwater Collection and Author's collection.

Figure 3. On colorful trade cards babies showed how much they appreciated a proprietary's virtue. John Spaulding King, Jr., Collection, Edward G. Miner Library, School of Medicine and Dentistry, University of Rochester, Rochester, N.Y.

Cascarets combined the reversible trade-card gambit with the time-tested before-and-after approach to aim a laxative at the kiddies' market .[21] In almanacs the illustrations were less polished.[22]

The pulling power of the child evidently seemed so persuasive that it could be used to boost remedies by no means indicated for children. Hence the appearance of Lydia Pinkham's granddaughters.[23]

The mention of Lydia Pinkham provokes the transitional comment that a study of nostrums appealing peculiarly to women or of nostrums directed especially toward men would almost certainly provide the research worker with more abundant source material than does an essay on nostrums aimed specially at the ills of children. Indeed, this generalization might even hold true for a study of male or female remedies related somehow to children. A long tradition exists of advertisements offering "A Boon to Men."[24] Sometimes, but by no means always, such advertisements suggest that the restoration of failing powers is required to make paternity possible. Gland Glad, for example, was promoted as "Papa's Silent Partner."[25]

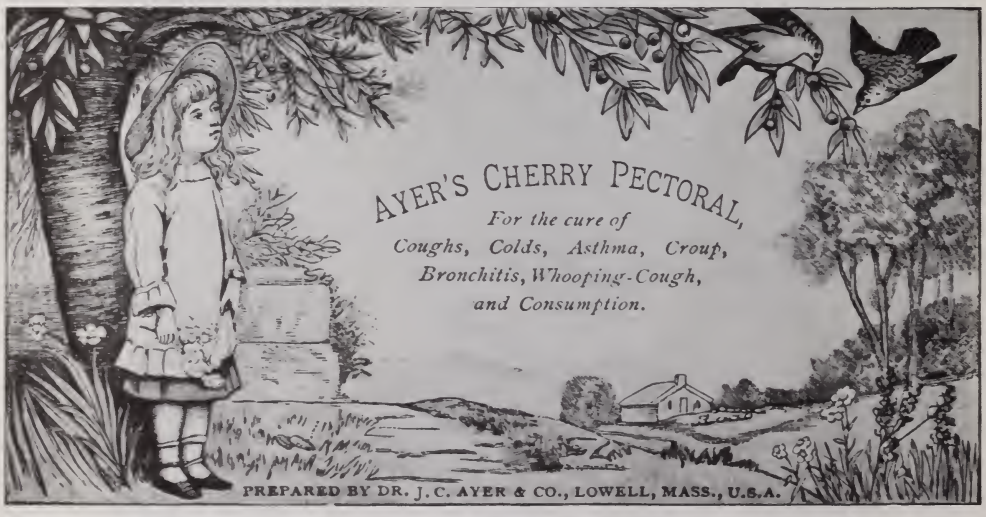

AYER'S CHERRY PECTORAL,
For the cure of
Coughs, Colds, Asthma, Croup,
Bronchitis, Whooping-Cough,
and Consumption.
PREPARED BY DR. J. C. AYER & CO., LOWELL, MASS., U.S.A.

Figure 4. Combining an innocent child with dreaded diseases. John Spaulding King, Jr., Collection, Edward G. Miner Library, School of Medicine and Dentistry, University of Rochester, Rochester, N.Y.

21. Cascarets trade card. Atwater Collection.

22. *Dr. J. H. McLean's Family Almanac* (1874). Author's collection.

23. Lydia E. Pinkham Vegetable Compound trade card. Atwater Collection.

24. Marston Remedy Co. advertisement. *Frank Leslie's Illustrated Newspaper* 56 (Feb. 24, 1883): 15.

25. T.S. Harding, *The Popular Practice of Fraud* (London, 1935) 15.

Figure 5. What's good for girl is good for Grandma. Collection of Business Americana, Smithsonian Institution, Washington, D.C.

Figure 6. Sarsaparilla helps the maiden as well as the babe. John Spaulding King, Jr., Collection, Edward G. Miner Library, School of Medicine and Dentistry, University of Rochester, Rochester, N.Y.

Greater complexity marks the women's market. Sadly, many found themselves pregnant against their wishes. An account of purported abortifacients forms one of the grimmest chapters in the history of quackery.[26] Other women hoped for a child seemingly in vain. The headline "Do You Want a Baby?" over the advertisement for a nostrum must have quickened many a would-be mother's heart.[27] The makers of one such product resorted to poetry:

Lucina Cordial! — Barren wives
It turns to mothers fair,
And the fond name of father gives
To husbands in despair.[28]

Another group of patent medicines catered to wives who did become pregnant and wanted to avoid miscarriage and lessen the vicissitudes of labor. Mitchella Compound addressed itself "To Women Who Dread Motherhood" and promised help in "the Alleviation of the Annoyance of Gestation and the Pains of Child-Bearing."[29] Dr. Pierce's Favorite Prescription offered the same assurances; moreover, the text stated, taking the medicine "insures healthy vigorous offspring, and promotes an abundant secretion of nourishment on the part of the mother."[30] In due course, similar claims brought a charge of misbranding against a nostrum named Mother's Friend.[31]

Compared with these medicines fabricated for parents, proprietaries made expressly for children seem less abundant. The advertising in *Harper's Weekly* for 1876, the centennial year, reveals many panaceas for everybody but no specifics aimed at the very young. The closest link between children and health touted a soap devoid of the "repulsive impurities" that made most soaps so harsh.[32] Babbitt's was said to be mild enough for children's tender skin.

Nonetheless, proprietaries for children do appear. A Scranton physician, Dr. D. B. Hand marketed a list of eight remedies, all for the very young.[33] His

---

26. J.C. Mohr, *Abortion in America: The Origin and Evolution of National Policy, 1800-1900* (New York, 1978).

27. Gerald Carson, *One for a Man, Two for a Horse* (New York, 1961) 22.

28. E.S. Turner, *The Shocking History of Advertising!* (New York, 1953) 81.

29. American Medical Association. *Nostrums and Quackery* 3 vols. (Chicago, 1912-1936) 1:236-237.

30. Adelaide Hechtlinger, *The Great Patent Medicine Era* (New York, 1970) 69.

31. U.S. Department of Agriculture, "Notice of Judgment No. 203," (1910) Food and Drugs Act.

32. Babbitt's Toilet Soap advertisement, *Harper's Weekly* 20 (1876): 1064.

33. Dr. D.B. Hand trade card. Atwater Collection.

Figure 7. A symbolic promotion of a proprietary cod-liver oil preparation. Collection of Edward C. Atwater, Rochester, N.Y.

promotion contained compliments on his character from two Catholic priests, one rabbi, and eight varieties of Protestant clergymen residing in Scranton, as well as from Terence Powderly, General Master-Workman of the Knights of Labor. By the standards of his day, Dr. Hand's claims are modest for his Colic Cure, Pleasant Physic, Worm Elixir, Cough and Croup Medicine, Teething Lotion, Diarrhoea Mixture, Chafing Powder, and General Tonic (Figure 8). Hand's remedies remained on the market long after Dr. Hand's demise.[34]

Individual medicines also were marketed for specific childhood complaints. Some proprietaries, like Dr. Ransom's Hive Syrup and Tolu, took aim at "that Midnight Horror, [the] Croup."[35] Medicines like Curolene, intended for vaporizing, sought a similar market.[36] "The vapors of Curolene . . . ," one advertisement read, "carried to every passage and cell of the respiratory organs . . . are pleasant, of the nature of carbolic acid, yet will not injure the youngest child."

Some vermifuges seemed directed almost exclusively at a juvenile market (Figure 9).[37] The same was true of some laxatives. Castoria led this parade, one of the few truly patented proprietaries to achieve tremendous circulation.[38] The 1868 patent revealed a complicated formula, essentially syrup of senna with aromatics.[39] When the patent expired, competing Castorias battled each other fiercely. The original product was boasted to be "harmless as farina, as pleasant as honey, and more efficient than Castor Oil."[40] Its promoters became expert at the scare technique. "Infant mortality is something frightful . . . ," one advertisement read, "22 per cent, or nearly one-fourth, of all born die from stomach and bowel troubles before the age of one year." Castoria virtually promised to "cure all these ills." In spurring trade, statistics might not have been so effective as maudlin verse:

---

34. Dr. Hand's Diarrhoea Mixture bottle. Author's collection.

35. Dr. Ransom's Hive Syrup and Tolu bookmark. Atwater Collection.

36. Hechtlinger (note 30), p. 159.

37. Winer's Canadian Vermifuge poster. Bella C. Landauer Collection, The New-York Historical Society.

38. Castoria trade card. Atwater Collection.

39. H.H. Holcombe, "Private Die Proprietaries: The Centauer Company," *Weekly Philatelic Gossip* (June 27, 1942): 369, 375.

40. Hechtlinger (note 30), p. 157.

Figure 8. Dr. Hand aimed exclusively at the children's market. Collection of Edward C. Atwater, Rochester, N.Y .

Grim death has taken darling little Jerry,
The son of Joseph and Seveva Vowels;
Seven months he suffered with the dysentery,
And then he perished with his little bowels.
Perhaps was weaning little Jerry,
His bottle seemed to hurt his stomach's tone;
But with the angels he'll get plump and merry
For there's no nursing bottles where he's gone.[41]

"Oh, what a pity," the moral is made bluntly in the advertisement, "that Mrs. Vowels did not know about CASTORIA."

Dietary difficulties, alluded to in this Castoria jingle, brought forth a type of proprietary that hovered over the border between drugs and foods. Mothers of babies who had difficulty thriving on the breast could turn to various commercial products which were advertised to make the little one prosper and to protect against such ills as cholera infantum and summer complaints. Wells Richardson & Co.'s Lactated Food stood out prominently in this market (Figure 10).[42] Other names included Imperial Granum, Eskay's Albuminized Food, Carnrick's Lacto-Preparata, Highland Brand.[43] Wells Richardson issued a pamphlet portfolio of baby portraits.[44] A testimonial accompanied each picture from the family praising Lactated Food for changing a "poor, puny . . . peevish" baby into a child imbued with "perfect health and good nature." The portfolio closed with two sets of triplets, both from Pennsylvania. Not to be outdone, Lacto-Preparata featured a testimonial about Texas quadruplets.[45] These advertisements from the era of the Gibson girl present an image of the healthy, attractive child which stresses corpulence. The portraits of babies make this clear, and the point is reinforced in explicit ways. A trade card for Carnrick's Soluble Food depicts a teeter-totter on which a fat baby who uses the product balances three skinny babies who don't.[46] An advertisement for another kind of product, Grove's Tasteless Chill Tonic, boasts that the Tonic "Makes children and adults as fat as pigs." Illustrated is a

41. Young (note 12), pp. 183-184.

42. Lactated Food trade card. Atwater Collection.

43. Trade cards and promotional pamphlets. Collection of Business Americana, Museum of History and Technology. Smithsonian Institution.

44. Wells Richardson & Co., *Baby's Portraits* (Burlington, Vermont, 1888). Collection of Business Americana, Smithsonian.

45. Reed & Carnrick, *Baby is King* (New York, 1890). Collection of Business Americana, Smithsonian.

46. Carnrick's Soluble Food trade card. Collection of Business Americana, Smithsonian.

Figure 9. A delicate hint to mothers. Prints and Photographs Division, Library of Congress, Washington, D.C.

very fat pig bearing the head of a child (Figure 11).[47]

LACTATED FOOD.
150 MEALS FOR $1.00
IT MAKES THEM HEALTHY, HAPPY, HEARTY!
THAT'S WHY THEY LOVE IT.
PAMPHLET FREE. WELLS, RICHARDSON & CO., BURLINGTON, VT.

Figure 10. A type of proprietary that hovered over the border between drugs and food. Collection of Edward C. Atwater, Rochester, N.Y.

By the early 1880s commercial infant foods had begun to receive sharp criticism. Dr. Ephraim Cutter, a physician of Cambridge, Massachusetts, used a microscope and simple chemical tests to study such products and termed them "without exception, valueless for dietetic purposes," consisting of baked flour for the most part, sometimes mixed with sugar, salt, or milk.[48] His results, he said, would "startle most mothers who have relied upon the extravagant pretenses set forth in the circulars of manufacturers." Cutter's critique stirred up a hornet's nest, but his revelations did not, as he had hoped, succeed in "rescu[ing] infant life from quack articles of nutriment."

Another category of baby nostrums produced, in time, the most widespread alarm, narcotic soothing syrups. These were American secret-remedy cousins of the old English Dalby's Carminative and Godfrey's Cordial. The most famous

47. Grove's Tasteless Chill Tonic trade card. Collection of Business Americana, Smithsonian.

48. *New York Times,* March 22 and 26, 1881; Aug. 10, 1882.

brand, Mrs. Winslow's Soothing Syrup, went on the market during the 1830s,[49] the same decade in which American manufacture of morphine salts began.[50] Competing brands soon crowded the marketplace. Opium still held high repute in medical circles, not only for its pain-killing properties but for purposes of therapy.[51] The hazard that concerned physicians and pharmacists, reflected in the action of the Philadelphia College of Pharmacy, related to overdosage. Isolated warnings had been given about the risk of habituation, but these were neither widely discussed nor regarded as a matter for occidental concern: such habituation seemed to be a peculiar oriental susceptibility. The use of opium for quieting crying children burgeoned; this applies both to opium bought as such and to opium purchased unknowingly in the secret-formula soothing syrups. In England, where the industrial revolution started off earlier than in America, the children of workers were habitually drugged (Figure 12). Their day-nurses quieted them with opium.[52] As early as 1776 an English observer had written: "[T]hose convulsions which carry off thousands of infants every year are chiefly owing to the brutality and laziness of nurses who are for ever pouring Godfrey's Cordial down their little throats, which is a strong opiate and in the end as fatal as Arsenic."[53] A recent reviewer has said, disputing Karl Marx's dictum, that "opium, not religion, was the opium of the people."[54]

In the United States, in contrast with Britain, women very seldom worked in the mills after becoming mothers; such work was even infrequent after marriage.[55] So the abuse of children by callous day-nurses who doled out opium scarcely posed a problem. American children, nonetheless, received opium unwittingly from their own mothers, especially as an ingredient in patent soothing syrups. Urged on by advertising, mothers administered the syrups to help children safely through what was deemed the most perilous transition of childhood, the time of teething.

---

49. H.H. Holcombe, "Private Die Proprietaries: Jeremiah Curtis & Son," *Weekly Philatelic Gossip* (Feb. 14, 1942): 608-609.

50. D.F. Musto, *The American Disease, Origins of Narcotic Control* (New Haven, 1973) 2.

51. Glenn Sonnedecker, *Emergence of the Concept of Opiate Addiction* (Madison, 1963) 1-14. (Reprinted from *Journal Mondial de Pharmacie* 3 (1962): 275-290; 1 (1963): 27-34.)

52. Virginia Berridge, "Opium Over the Counter in Nineteenth Century England," *Pharmacy in History* 20 (1978): 91-100.

53. Henri Siebert, "The Progress of Ideas Regarding the Causation and Control of Infant Mortality," *Bulletin of the History of Medicine* 8 (1940): 551.

54. Frank Kermode, "Grandeur and Filth," *New York Review of Books* (May 30, 1974): 9.

55. Jonathan Prude, Personal communication to author, 1978.

MAKES CHILDREN AND ADULTS AS FAT AS PIGS.
NO CURE NO PAY
Price 50 Cents.
GROVE'S
TASTELESS CHILL TONIC
ON THE MARKET OVER 20 YEARS
1½ MILLION BOTTLES SOLD LAST YEAR

Figure 11. Healthy children are fat children. Collection of Business Americana, Smithsonian Institution, Washington, D.C.

The doctrine of the nostrum makers had ancient and orthodox antecedents. Samuel X Radbill began as follows his excellent article on teething:[56] "Teething has always been regarded as one of the milestones in the health of a child; parents could not rejoice until the child had safely survived the period of dentition." Dr. Radbill listed a multitude of symptoms which physicians, through the centuries, associated with the teething disease, including "General unrest, sleeplessness, night terrors, drooling, epilepsy, paralysis, vomiting, . . . rickets, running ears, deafness, colds, coughs . . . , croup . . . ." That contemporaneity in time of these symptoms and teething did not invariably signify cause and effect had been pointed out increasingly by perceptive medical observers. Yet the old views continued to hold some sway into the twentieth century, not least of all in the advertisements for soothing syrups.

"[T]he period of Dentition," warned the British maker of a teething powder, "is one of more than ordinary peril to the child. It is a time of most active development, a time of passing from one mode of being to another, and we may fairly congratulate ourselves when this time of Teething be passed."[57] Another entrepreneur cited the "distressing symptoms which children suffer while cutting their teeth — viz., Feverish Heats, Fits, Convulsions, Sickness of Stomach and Debility, accompanied by Relaxation of the Bowels, and pale and green motions, or Inflammation of the Gums."[58] The producers of such powders and syrups promised to shepherd babies through their time of troubles. As the makers of Mrs. Winslow's put it, their Soothing Syrup had "been used by mothers for children teething for over fifty years with perfect success. It relieves the little sufferers at once, produces natural, quiet sleep by freeing the child from pain, and the little cherub awakes 'bright as a button'."[59]

This rosy view of their opiate for little darlings the Winslow proprietors also sought to convey pictorially. A modern leader in advertising, David Ogilvy, has written that the best way to attract a woman's attention is to use a picture of a baby.[60] This truth was known to the makers of Mrs. Winslow's Soothing Syrup. They painted this message on glass during the years of the Civil War,[61] presented

---

56. S.X Radbill, "Teething in Fact and Fancy," *Bulletin of the History of Medicine* 39 (1965): 339-45.

57. British Medical Association, *Secret Remedies* (London, 1909) 130.

58. Ibid., p. 131.

59. Mrs. Winslow's Soothing Syrup handbill. Bella C. Landauer Collection, The New-York Historical Society.

60. David Ogilvy, *Confessions of an Advertising Man* (New York, 1963) 119-120.

61. Winslow painted glass sign. Edward G. Miner Library, University of Rochester.

Figure 12. An early warning signal. *Harper's Weekly,* 1883, III:80, taken from *Punch*, 1849, XVII:193. This illustration was called to my attention by William Helfand.

it through lithographs, [62] and then conveyed it broadcast through trade cards that linked the product with a happy mother and children enjoying buoyant health (Figure.13).[63] When Civil War tax policy permitted proprietary manufacturers to design their own dies for tax stamps, the producers of Mrs. Winslow's did so, and issued the only private-die proprietary medicine stamp to picture a child (Figure 14). [64]

Figure 13. The best known and most castigated morphine soothing syrup. Collection of Edward C. Atwater, Rochester, N.Y.

Modern comprehension of the dangers of opium addiction begins in the 1860s and quickens especially in the 1870s.[65] The importation of crude opium into the United States accelerated steadily and reached the peak of per capita import in 1896.[66] A major factor in the rising awareness of danger was observation of the

---

62. Winslow poster. Bella C. Landauer Collection, The New-York Historical Society.

63. Winslow trade cards. Atwater Collection.

64. Winslow tax stamp. Richard F. Riley Collection, Pacific Palisades, California.

65. Sonnedecker (note 51), pp. 16-20.

66. Musto (note 50), pp. 1-13.

results of the hypodermic injection of the soluble salts of opium alkaloids, a practice introduced in England in 1855. As the century approached its close, addiction came to appear more abhorrent, for a wave of moral revulsion was added. At the end of the century, moreover, opium in patent medicines — including that in proprietary preparations for children — also peaked, both in quantity of total sales and in content of opium.

Criticism of soothing syrups forms part of this expanding awareness of danger. One early episode related to Mrs. Winslow's Soothing Syrup and provoked a mild rift in the woman's suffrage movement. In 1868, Elizabeth Cady Stanton and Susan B. Anthony launched a journal, called *The Revolution,* to carry their ideas to the world. One plank in their editorial platform proclaimed: "Devoted to Morality and Reform, THE REVOLUTION will not insert . . . Quack Advertisements, which even Religious Newspapers introduce to every family."[67] *The Revolution* editorialized strongly against "Quack Medicines," especially "Foeticides and Infanticides."[68] The periodical, however, did not attain financial stability, and after two years Stanton and Anthony were forced to sell it.[69] The purchaser had been one of *The Revolution*'s literary contributors, Laura Curtis Bullard.

Figure 14. A child on a proprietary medicine tax stamp. Collection of Richard F. Riley, Pacific Palisades, Cal.

Mrs. Winslow herself seems a figure so shadowy as to approach the mythical. Purportedly she was a nurse and physician who devoted her time and talents to the young.[70] Laura Curtis Bullard, on the other hand, was unquestionably real and

---

67. Masthead, *The Revolution,* Jan. 8, 1868.

68. Editorial, *The Revolution,* March 26, 1868.

69. Alma Lutz, *Created Equal, A Biography of Elizabeth Cady Stanton* (New York, 1940) 191

70. Holcombe, "Jeremiah Curtis & Son," (note 49) 608.

wealthy, her family fortune being based on Mrs. Winslow's Syrup.[71] So, after she had bought out the interest of Miss Anthony and Mrs. Stanton, she changed *The Revolution*'s advertising policy. Soon its columns displayed nostrum ads, including one headed in bold letters: "CHILDREN TEETHING," followed by an italicized appeal to *"MOTHERS! MOTHERS!! MOTHERS!!!"*[72] Smaller type acclaimed Mrs. Winslow's Soothing Syrup for its "never-failing success" at teething time and termed it "the BEST AND SUREST REMEDY IN THE WORLD in all cases of DYSENTERY AND DIARRHOEA IN CHILDREN." Observing the new fate of their former newspaper, Mrs. Stanton wrote Miss Anthony a commiserating letter. "And think," she bemoaned, "of our sacred columns full of the advertisements of quack remedies!"[73]

Soon after this episode, Mrs. Winslow's Syrup received rebuke for its opium content in such diverse sources as a humorous volume on doctors[74] and a sober journal of pharmacy.[75] In the latter a California physician reported the death of several babies who had been given the Syrup. "[F]ew children at the age of six months," he added, ". . . would not be poisoned to death, were they to take the syrup as directed. . . , unless a tolerance be induced by its previous administration in small doses." The doctor asserted that a teaspoonful of Mrs. Winslow's medicine contained morphine equal to twenty drops of laudanum, and he surmised that thousands of babies might be dying from opium poisoning because of the ignorance of mothers and nurses.

Because of its leading place in the market, Mrs. Winslow's bore the chief brunt of an increasing attack on the baby syrups. In 1892, during the Senate debate over the Paddock bill, the one broad food and drug measure to pass a house of the Congress before the twentieth century, a Tennessee senator criticized the bill by asking: "Why are the compounds of coffee to be analyzed, and Mrs. Winslow's Soothing Syrup allowed to escape the prying eye of the chief chemist?"[76]

Even the old English nostrums received new rebuke. In his novel, *Miss Ravenal's Conversion,* John William DeForest has one of his physician characters say:[77]

---

71. Lutz (note 69), p. 191.

72. Winslow advertisement, *The Revolution,* July 7, 1870.

73. Lutz, *Created Equal,* p. 191.

74. A.D. Crabtre, *The Funny Side of Physic* (Hartford, 1874) 89.

75. W.F. McNutt, "Mrs. Winslow's Soothing Syrup — A Poison," *American Journal of Pharmacy,* 44 (1872): 221-224.

76. W.B. Bate, *Congressional Record,* 52nd Congress, 1st session (Feb. 23, 1892) 1368.

77. J.W. DeForest, *Miss Ravenal's Conversion* (New York, 1955. Original edition, 1867) 434-435. Lettie Carson of Millerton, New York, directed my attention to this quotation.

"Babies now-a-days have need of being cleverer than they used to be. They have more dangers to evade, more medicines to spit out."

"I know what you mean," replies his daughter. "You always did rebel against Dalby. But what was I to do? . . . [The baby] *would* have the colic."

"I know it! He would! But Dalby couldn't help it. Don't, for pity's sake, vitiate and torment your poor little angel's stomach, so new to the atrocities of this world, with drugs. These mixers of baby medicines ought to be fed on nothing but their own nostrums. That would put a stop to their inventions of the Adversary."

A generation of criticism later, in the final phase of patent-medicine muckraking before enactment of the Pure Food and Drugs Act of 1906, Samuel Hopkins Adams cited another conversation to the same intent. A New York lawyer, asked by his office scrubwoman to buy a ticket for an "association" ball, inquired of her:[78]

"How can you go to these affairs, Nora, when you have two young children at home?"

"Sure, they're all right," she returned blithely; "just wan teaspoonful of Winslow's an' they lay like the dead till mornin'."

Adams continued to make his point about "the subtle poisons" by quoting a Detroit physician. Babies constantly pacified by Mrs. Winslow's syrup, this doctor said, "eventually come into the hands of physicians with a greater or less addiction to the opium habit. The sight of a parent drugging a helpless infant into a semi-comatose condition is not an elevating one for this civilized age."

The law of 1906 did not banish opiates from over-the-counter drugs. Reflecting the Progressive conviction that an informed citizen would be a prudent consumer, the law required that the quantity of any morphine, opium, heroin, and cocaine be stated on the label.[79] The law also forbade label statements "false or misleading in any particular." Just before and after enactment of the law, some proprietors curtailed the quantity of opium in their nostrums and cut back the promises made in the labeling. But the Bureau of Chemistry of the Department of Agriculture, charged with enforcing the law, easily found cases that it could bring into court. Hodnett's Gem Soothing Syrup, for example, bore a label which denied that it contained morphine, although admitting to 4 4/5 grains of opium per ounce.[80] The carton bore a reassuring message: "Mothers need not fear to give this medicine to the youngest babe, as no bad results come from the continued use of it." The Bureau obtained a judgment which declared the syrup misbranded. And it won other victories of this kind.

---

78. S.H. Adams, *The Great American Fraud* (Chicago, 1906) 40.

79. Act of June 30, 1906. Ch. 3915, 34 Stat. 768.

80. American Medical Association (note 29) 1:538.

In 1911, however, the Supreme Court ruled that the "false and misleading" provision of the law did not apply to therapeutic claims made on the label.[81] An amendment rushed through the Congress set for the Bureau a severer task, requiring it to prove labeling promises both "false and fraudulent" in order to secure conviction.[82] For a time the Bureau brought cases on technical grounds, such as misstating on the label the amount of a key ingredient.[83] At the same time, both the enforcement agency and many journalists let the Congress and the public know that the menace of the soothing syrup had not been ended by the law. The Bureau's drug expert listed by name for a presidential commission the numerous children's nostrums containing opiates.[84] For a Congressional hearing he heaped such bottles high upon a table.[85] In 1910 the *Philadelphia North American* praised a crusade against baby-killers begun by the city's department of public health.[86] In the Midwest the *Chicago Tribune* raised an alarm.[87] A cartoon by John T. McCutcheon in that paper turned against nostrums their own "Before Taking" — "After Taking" approach. In the first panel an evil-looking patent medicine vendor and a distraught mother stand beside a cradle. He sells her his product, saying, "That'll make it stop crying. 50 cents, please." In the second panel the empty bottle lies on the floor; the nostrum vendor slinks away; the mother weeps. Invisible in the cradle, the baby cries no more.

Such propaganda reflected the fear of narcotics which had gripped the nation, leading to the Harrison Act of 1914.[88] Proprietors remained too powerful politically to let this law remove opiates completely from over-the-counter medicines, although a ceiling was placed on the amount they could contain. Soon, however, the trade association of leading proprietors decided that no member should market a narcotic medicine.[89] The makers of Mrs. Winslow's Soothing

---

81. United States v. Johnson. 1911. 221 U.S. 488.

82. Act of August 23, 1912. Ch. 352, 37 Stat. 416.

83. American Medical Association (note 29) 1: *passim,* e.g. p. 573.

84. Ibid., pp. 486-488.

85. Museum exhibit. A War on Narcotic Soothing Syrups. Food and Drug Administration Museum, Washington.

86. Clipping, *Philadelphia North American,* August 9, 1910. FDA Museum.

87. John T. McCutcheon cartoon, *Chicago Tribune,* n.d. 1910. FDA Museum.

88. Act of Dec. 17, 1914. Ch. 1, 38 Stat. 785.

89. J.H. Young, *The Medical Messiahs* (Princeton, 1967) 57.

Syrup had reduced the amount of its morphine from 0.4 grain per ounce in 1908 to 0.16 grain in 1911.[90] In 1915, amidst a crash program aimed at the baby-killers, the Bureau of Chemistry brought a charge of misbranding against the Winslow company.[91] Even before the proprietors had lost this suit, they dropped the word "Soothing" from the Syrup's name and eliminated the morphine from its formula.[92] The traditional package continued to look much the same. In 1921 the company launched a damage suit against a motion-picture producer, alleging that a caption in a film had held Mrs. Winslow's Syrup up "to public scorn and derision."[93] The scene had depicted an explosion which knocked several people unconscious. The caption read: "As a sleep producer, Charlie's incense has it all over Mrs. Winslow's Soothing Syrup." The Syrup, the company told the court self-righteously, contained no opiate.

Regulatory victories secured under the 1906 law, and under the stricter Food, Drug, and Cosmetic Act of 1938, improved the state of widely sold proprietary medicine for children but did not eliminate quackery that preyed upon the young. During the 1940s and '50s, for example, a parade of pathetic children marched to the Kaadt diabetic clinic in Indiana and, upon advice given there, abandoned insulin.[94] Eleanor Swanson, at the age of eight, forsook her physicians for three years to make nine trips to this clinic, neglecting insulin and eating all the pie and cake she wanted. Disaster came in the form of diabetic cataracts. Six operations were required to remove the lenses from Eleanor's eyes. When she testified in court against the Kaadts, without her thick eyeglasses she could see the district attorney twelve feet away only as a dim shape.

In 1958 a Pennsylvania state senator sought to stir up interest in the legislature in behalf of Harry Hoxsey's unorthodox cancer treatment, then being introduced at a clinic in Portage.[95] On the floor of the chamber the senator introduced Kathy Allison, a young girl from Indiana. "Here, Mr. President," he said, taking Kathy into his arms, "is that little angel who, according to medical science, had to meet

---

90. Musto (note 50), 2 p. 94.

91. U.S. Department of Agriculture, "Notice of Judgment 4110 under the Food and Drugs Act," Service and Regulatory Announcements, 1915.

92. H.H. Holcombe, "Private Proprietary Stamp Notes (The Anglo American Drug Company)," *Stamp and Cover Collectors Review* (April, 1937): 91-93.

93. Anonymous, "Libel Suit Based on Motion Picture Caption," *Printers' Ink* 115 (June 9, 1921): 52.

94. Young (note 89), p. 233.

95. Ibid., pp. 385-386.

the angels soon. Today, she is going to school; was x-rayed last week and found to be cancer-free and is playing like any other normal child." Hoxsey had treated her; God had spared her. Eight months later Kathy died of cancer of the chest.

In recent weeks three cases have surfaced in which state government agencies have sought to impose conventional treatment upon children suffering from cancer whose parents have wished to rely solely upon laetrile.[96] In Georgia a juvenile court took custody of a girl suffering from Hodgkin's disease away from her parents and gave it to the state Department of Human Resources. In Albany, New York, a judge ruled the other way, deciding that parents could place their eight-year-old son in the hands of a "metabolic" doctor who believed in laetrile. In Florida agile parents made several moves with their child, successfully escaping the jurisdiction of any one court which might have questioned their desire to treat the child's cancer only with laetrile. No doubt other children are being deprived of orthodox treatment as the laetrile boom roars on.

Thus, even in our own day, nostrums and children present a sober and somber theme.

Department of History
Emory University
Atlanta, Georgia 30322

---

96. Paul Lieberman, "Court Bars Girl from Laetrile," *Atlanta Constitution,* Feb. 3, 1978.

Maturation Age of the Growing Child in Relation to the Timing of Statural and Facial Growth at Puberty

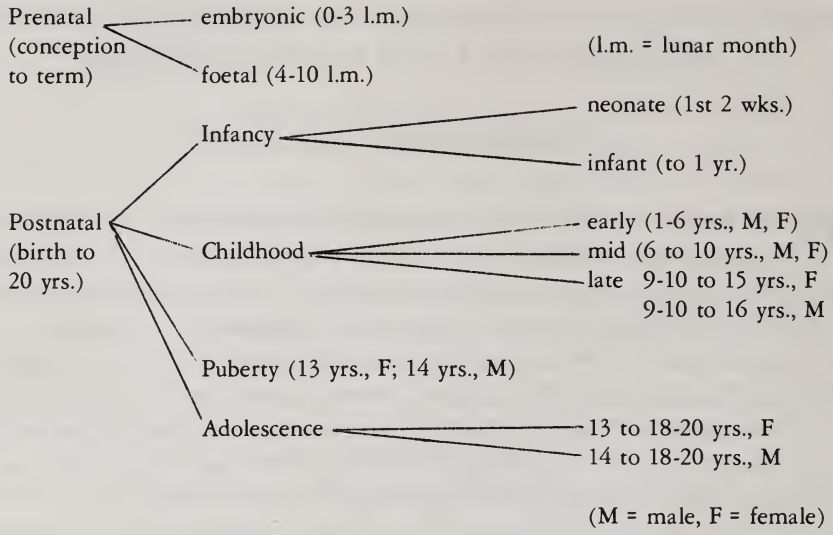
WILTON MARION KROGMAN

WE are all, in one way or another, "clock-watchers"; almost without exception everything we do is regulated by Time. Man, as the saying goes, "keeps time" in ordering the pattern of his life. To do this he has devised several different kinds of clock: *intrinsic,* such as the hourglass, the pendulum, and the hairspring balance; *extrinsic,* such as the sundial and the electric impulse.

The basic fact in man's external environment is rhythmicity, which is governed by the movements of the earth relative to the sun and the moon. Man has adapted this rhythmicity in his cultural time-ordering: the lunar day is 24.8 hours; the synodical month is 29.5 days, determined by the moon's relative position between sun and earth; the year is 365 days, 5 hrs., 14 min., related to the revolution of the earth around the sun. This sidereal time is our cultural calendric time; it is the basis of the most commonly used measure of time, viz., that of chronological time. This gives us man's universal age-time, chronological age, which is essentially birth-day age, i.e., we reckon a child's age in terms of when he was born. Culturally speaking, a child born July 1, 1968, is 10 years old on July 1, 1978; all children so born are of the same chronological age. All legal documents register by birth-day age; most of our "norms" or "standards" or "tables of averages" are so regulated. As far as the growing human organism is concerned, chronological age is absolutely extrinsic, imposed, in a real sense, from without; it bears some relation to growth-time, of course; a ten-year-old boy is normally larger than a nine-year-old boy in most attributes of growth, both dimensional and proportional.

The set or pattern of a child's over-all physical growth can be determined rather early. Here are some ways of ascertaining this: 1) we may speak of "canalization" by about five years of age, e.g., the child is at his 10th percentile, or 35th, or 80th, by that age and will normally hold it; 2) we may speak of "channelization," as on the Wetzel Grid, where "physique channel," determined by height-weight growth, is established by about five years of age; 3) we may speak of the persistence of the somatotype, wherein the total morphogenetic structure is pretty well expressed by about seven years of age.

Our growth-period classifications are based on the recognition of intrinsic stages or phases of biological time (even though we express ourselves in terms of chronological age). Here is the classification I have used (Krogman, 1972):



Obviously the age-ascriptions of these growth-periods are only very general, the more so as the child gets older. For example, the timing of late childhood is subject to great individual variation, especially with reference to the advent of puberty. One further statement I must make, viz., that I feel that "adolescence" is not so much biological as it is behavioral — it is essentially a transition period between the attainment of sexual maturity and the achievement of adult growth-status.

The use of the phrase "sexual maturity" sets the stage, now, for a thorough look at biological timing in the human child. The concept of maturity applies not only to man but to all life-forms. In man it applies even more broadly, for it is bio-behavioral.

In broadest sense the processes of higher organic life center around three major complexes or phases: 1) fertilization, or the initiation of viability; 2) existence, or the maintenance of viability; 3) death, or the cessation of viability. I am using "viability" here in the sense of "life"; function and form are implicit. Somewhere in this continuum the concept of maturity must fit in. If it does, it becomes, by definition alone, basically an event or stage in the entire process; moreover, it is probably relative rather than absolute, for it must, I believe, apply not only to function and form as a whole, but to function and form of all component systems or parts.

The use of the concept of maturity in such a biological context involves the idea that growth and development represent an overall continuum, dependent in turn upon a series of integrated systemic continua: a whole plus its constituent parts. The use of the term "integrated" implies a species-linked genetic differential timing of growth. In this sense I would define "maturity" essentially as the attainment of genetically designed full functional efficiency or structural integrity

and form. In essence this implies that the purpose for which the function or form was selected (in the sense of genetic, evolutionary selection) has been fully realized as the result of the unfolding, during growth-time, of all necessary morphological, physiological and biochemical processes. Maturity, therefore, is equated with the final attained developmental organic stage, be it of the part or of the whole. The organism as a whole, or the part as an integral entity, is adult in the sense that growth, per se, has ceased. It is true, of course, that growth at molecular and cellular level never ceases; I am distinguishing between "growth" which is essentially additive, and "growth changes" which are essentially replacement or restoration.

We have developed several approaches to the assessment of progress toward maturity in the growing human child. Here I must mention a qualifying term, "maturation," which is a process, in contradistinction to "maturity," which is a goal. Further, I think there are two major maturity goals in human growth: sexual, which is full reproductive attainment, and adult, which is full achievement of growth potential. In my opinion the most reliable methods for evaluating the process of maturation center around radiological appraisals of bones and teeth, i.e., skeletal age and dental age. Next in reliability are the criteria of the stages of circum-pubertal development, i.e., primary and secondary sexual stages. Least reliable (because it is most variable) is the evaluation of dimensional attainment (e.g., stature or limb lengths) in terms of an age or age-and-sex standard, i.e., morphological age.

I think we may accept that the use of x-ray film standards of the developing skeleton gives us an acceptable baseline for the assessment and evaluation of biological growth-timing. It should be recognized at once that there is an entrenched sex difference: at birth females are about four weeks ahead of males; this holds, so that at puberty boys are developmentally about at an 80% level compared to girls of the same chronological age; girls attain puberty and final mature size about two years earlier than boys. This basic sex difference demands a set of developmental standards or norms for each sex.

The question now to be posed is that of significance. In the skeleton we have a reasonably reliable yardstick with which to measure maturation and to time the achievement of maturity. This being granted, how does skeletal age tie in or correlate with other processes of organic development?

Green (1961) reports on 56 male, white children aged eight to twelve years as follows, correlating chronological age (CA), skeletal age (SA), dental age (DA), weight age (WA), and height age (HA), SA and DA being more strictly biological, WA and HA more strictly morphological.

The correlations are all positive and suggest that maturation and growth are a "package-deal," i.e., that bone and tooth, biologically, go together and that bone

and dimension, morphologically, also go together.[1]

	DA	SA	WA	HA
SA	0.4616	-	-	-
WA	0.4810	0.7570	-	-
HA	0.5630	0.7859	0.8145	-
CA	0.6774	0.6882	0.5534	0.6657

There is not much more profit in demonstrating that physical growth proceeds as a whole; within reason it is an accepted fact. There may be differences of degree but not of kind. For example, Johnston (1962) points out that "correlations exist between skeletal age progress and the increase of individual growth dimensions... [and that] these are higher where the dimension is a composite of several growth loci." Rothenberg *et al.* (1977) conclude: "The skeletal age appears to be a better indicator of physical maturation than does the chronological age of the individual."

Now let us make a foray into a bio-behavioral field: what or how does the concept of maturity relate to behavioral unfolding? In 1937 Todd stated:

> Maturity is not experience: it is that upon which experience imprints itself and without which experience does not register.... A child who is retarded in maturation will think and act like a younger child. Experiences normal for his age fail to register.

In 1941 Boas studied the relations between HA, SA, and intelligence quotient (IQ). He found a significant regression of the IQ on HA and SA at a given CA. He concluded:

> The close correlation between anatomical and psychological traits in childhood must be interpreted as due to the influence of the tempo of physiological development over the body and its functions.

Bayer and Bayley (1959) are in basic agreement with this; they observe that "stage and rate of maturation tend to be closely associated with behavior, as well as with the physical aspects of development."

It goes without saying, biological variability being what it is, that there are children who are early or late maturers and fast and slow growers, and that we can pair early with fast and late with slow. Accepting this stated dictum that organization and structure develop in forward reference to functional activity, but without its participation as a determining agent, we have a basis for relating biology to behavior, i.e., to a certain functional relationship between the *timing* (readiness?) of biological effectiveness and learning proficiency. The earlys tend to have higher intelligence test scores than the lates; this is a frequent observation. It is complicated, of course, by the fact that the former often conceive of themselves as more bio-culturally normal (and hence, acceptable) and present

1. Cheraskin and Ringsdorf (1972), using a tooth calcification schedule for DA, report that CA and DA have a correlation (r) of +0.833, $P < 0.01$.

more mature minds and personalities accordingly (see Krogman, 1962). I am not sure, in all this, how much advancement in the sum of all aspects of behavioral qualities is organic (structural and functional adequacy) and how much is supra-organic (emotional and cultural sufficiency). There is some of each, and here "maturity" is both physical and psychological. Tanner summarized the problem as follows:

> Evidently there is some general factor of bodily maturity throughout growth, creating a tendency for a child to be advanced or retarded as a whole: in the percentage attained of his eventual size, in his skeletal ossification, in his permanent dentition, doubtless in his physiological reactions, and also in his intelligence test scores and perhaps other psychological responses.

The evidence presented in this discussion of the pattern of human growth suggests a measure of truth in the conclusion that biological maturity definitely plays a basic role in *all* aspects of the maturation (or maturity) of the individual. We are what we are in biological fact, true, but we are also what we are in cultural acceptance — acceptance by us of our self-conceived role, acceptance by culture via incorporation and integration of a total personality. The biological hen and the cultural egg beg the question of priority.

Let us now, consider the relation between the timing of growth and maturation in the body generally and dimensional growth in the facio-dental complex (Krogman, 1968).

The most obvious dimension in the growth of the child's body is that of height, measured easily and reliably. In the second decade height shows marked acceleration in velocity, known as the maximum height velocity (MHV).[2] According to Tanner *et al.* (1962, 1975), it occurs at 14.1 + 0.86 yrs. in boys, and 12.1 + 0.87 yrs. in girls. Bayer and Bayley (1959) give 14.5 yrs. and 11.5 yrs. respectively. Stolz and Stolz (1951) report that the correlation (Pearsonian r) between MHV and sexual maturation is r = + 0.84 to + 0.89. According to Johnston (1962) the SA is related to MHV, i.e., it can "pull out the fast-growers and differentiate them from the children who are inherently tall."

In 1955 Nanda studied the relation of growth velocity in facial dimensions to MHV. He reported that the acceleration in the growth of facial dimensions occurred nine months after MHV. Bergersen (1972), however, found a significant correlation in 23 white males, followed from birth to maturity, between the adolescent spurt in facial dimensions and MHV. Brown *et al.* (1971) also reported that the peak velocity in facial dimensional growth occurred at the same time as the MHV, earlier in females than in males. This was confirmed by Graves (1974), who added that all carpal bones were ossified before the PHV and PFV (peak facial velocity). It is to be noted that Brown *et al.* and Graves reported on a longitudinal growth study of Australian aborigines ("Abos"). Graves states categorically that Caucasoids and Australoids (aborigines) are "similar in

2. Also called the "peak height velocity" (PHV).

patterns of carpal ossification and general body and facial growth."

Priority of completion of growth within the face is in order from above down, in both sexes, at about 18-21 years. Duration of maximum growth velocity is in almost exact reverse order. The female finishes facial growth about three years earlier, and her maximum growth velocity lasts from one-half to one year less. All told, there is a facial growth intensity period of about two to two and one-half years to consider.

	Male	Female
Average duration of over-all *face* growth	2.57 yrs. (range 1.4-4.1)	1.84 yrs. (range 1.1-4.4)
Average duration of *height* growth	2.6 yrs. (range 1.0-3.9)	2.6 yrs. (range 0.8-3.6)

In the male duration of facial and statural growth spurts is about the same; in the female the facial spurt is over with some time before that of height.[3]

No other part of the facial skeleton has received as much attention as the mandible. There seems to be a feeling that, to paraphrase, "as the mandible grows so grows the rest of the faciodental complex." There is no doubt that the mandible does partake of the overall circum-pubertal growth acceleration, especially in males. Moreover, in males, as a sex-related trait, there is notable growth at the outer symphyseal area, to produce a more prominent or "strong" chin.

In recent years the assessment of SA from the x-ray film of the hand and wrist has shifted from the overall inspectional method of Todd (1937) to the "maturity indicator" method of Greulich and Pyle (1959) and Pyle, Waterhouse, and Greulich (1971), to the bone-by-bone "point system" method of Tanner *et al.* (1955, 1975). It seems almost inevitable, therefore, that the trend should reach an ultimate, i.e., dependence on a single bone — the ulnar sesamoid of the thumb.

In four earlier studies the age at *beginning ossification* of the ulnar sesamoid of the thumb is given for females: Flory (1936) 11:0; Todd (1937) 11:9; Buehl and Pyle (1942) 10:1; Greulich and Pyle (1959) 10:0-11:0. In later studies Garn and Rohmann (1959) give 10:6 (range 8:0-13:0), Bjork and Helm (1967) 11:6 (range 10:2-13:4), and Pileski (1969) 10.88 (SD 1.04). In 30 girls Hansman and Maresh (1961) found an $r = +0.80$ between the CA appearance of the ulnar sesamoid and MHV. The ulnar sesamoid has been used as a predictor of puberty: Flory said it appeared two years *before* menarche; Buehl and Pyle said 2:6 *before* menarche;

3. These data are adapted from Bambha and Van Natta (1963).

Garn and Rohmann said that early or late appearance of the sesamoid is correlated with early or late onset of menarche; Bjork and Helm said that appearance of the sesamoid in girls *precedes* MHV and menarche by 1:0 and the r = +0.57 and +0.66, respectively.

Despite the feeling of all-eggs-in-one-basket that the use of a single bone (and a variable one, at that) may cause one to have, certain categorical statements have been made by Pileski (1969) with reference to mandibular growth: if the ulnar sesamoid appears between 10:6-11:6 in girls, it may be predicted "with 95% reliability" that peak mandibular velocity (PMV) will occur between 11:8-12:4; on the average the ulnar sesamoid appears 1:2 before PMV.

In 1973 Pileski *et al.* carried these statements a little farther when they reported what was termed maximum mandibular velocity (MMV) in relation to the ossification of the ulnar sesamoid. The subjects of the study were 91 boys and 108 girls, Canadian white children. The r for boys was +0.428, for girls +0.364, the average appearance of the sesamoid preceding MMV by 0.72 years in boys, 1.09 years in girls. In 74.7% of boys and 78.5% of girls, if the ulnar sesamoid was *not* present, MMV was still to come.

The adolescent growth spurt (MHV) was related to the ossification of the sesamoid of the thumb by Chapman (1972), who stated that its ossification occurs at the beginning of MHV. Sesamoid ossification and MHV are complete with the epiphyseal fusion of the proximal phalanx of the thumb. In the opinion of Graves (1974), ossification of the sesamoid indicates that peak growth velocity has begun or is imminent.

In 1971 Brown *et al.* added two other hand centers, the pisiform and the hook or hamular process of the hamate bone. They concluded that initial ossification of these two indicators of maturity preceded peak growth velocity in height and facial dimensions in most males and females. Initial ossification of the adductor sesamoid and advanced ossification of the hamular process coincided with peak growth velocity in most males and females. Graves and Brown (1976), in a study of 52 aboriginal boys and 36 girls, found that MHV occurs at the time of "epiphyseal capping in the fingers and radius" and ossification of the sesamoid and the hamulus of the hamate.

SUMMARY AND CONCLUSIONS

1. Chronological age (birthday-age) is the human time-regulator in terms of day, month, year.

2. Culturally, man is on a day-night schedule.

3. Organic life, generally, is governed by a circadian rhythm or biological time-clocks by which life, time, space are interrelated.

4. Man has an innate biological time-clock mechanism so that his growth-pattern is canalized in terms of percentile ranking, channelized in terms of height-weight ratio, and typed in terms of morphogenetic body-build (somatotype). Moreover, all these are established by the end of early childhood (five to seven years).

5. In human growth there are certain well-defined growth-stages or growth periods in pre- and postnatal life.

6. The concept of biological age may be expressed as maturation; it applies to all organic life, but in man it registers a bio-behavioral inter-relation that is a continuum linked to growth and time.

7. The skeleton, as seen on the x-ray film, is a register of the passage of biological time in the child; roentgen standards of the hand are available for assessment of skeletal age (SA) in terms of maturity indicators of ossifying bones.
8. Maturation age, expressed as SA, is significantly correlated with the circum-pubertal growth acceleration (as seen in maximum height velocity, or MHV, and the entire complex of sexual development).

9. There have been developed the categories of early, average, and late maturers, and fast, average, and slow growers; early-fast and late-slow express these correlations.

10. Acceleration in growth of the facio-dental area (expressed by certain dimensions) is related to MHV.

11. Growth of the mid-face seems to have a higher correlation (*r*) with MHV than does growth of the lower face.

12. There is some residual facio-dental growth (c. 4-8% and c. 3-7 mm.) after MHV.

13. The duration of maximum facial growth spurts, after MHV, is about 2½ yrs. in males, 2 yrs. in females; while MHV lasts 2½ years in each sex.

14. Incipient ossification of the ulnar sesamoid bone of the thumb has been used to predict menarche and to predict maximum mandibular velocity (MMV).

15. Conservatively, it may be concluded that if the ulnar or adductor sesamoid of the thumb has *not* begun to ossify, MMV is still to be achieved. The

pisiform and the hamular process of hamate stand in a related fashion.

16. The value of biological age assessment (SA) resides in its relation to the timing of growth. It is significantly correlated with growth in stature and in size and change of proportion in the facial bones that support and surround the dental complex.

17. In the sense of growth-timing SA may be used as a predictor, i.e., progress in SA is related anticipatorily to increase in osseous dimensions.

REFERENCES

J.K. Bambha and P. Van Natta, "Longitudinal Study of Facial Growth in Relation to Skeletal Maturation During Adolescence," *Am. J. Orthod.* 49 (1963):481-493.

L.M. Bayer and N. Bayley, *Growth Diagnosis* (Chicago: University of Chicago Press, 1959).

E.O. Bergersen, "The Male Adolescent Facial Growth Spurt: Its Prediction and Relation to Skeletal Maturation," *Angle Orthod.* 42 (1972):319-338.

A. Bjork and S. Helm, "Prediction of the Age of Maximum Pubertal Growth in Body Height," *Angle Orthod.* 37 (1967):134-143.

F. Boas, "The Relation Between Physical and Mental Development," *Science* 93 (1941):339-342.

T. Brown, M.J. Barrett and K.C. Graves, "Facial Growth and Skeletal Maturation at Adolescence," (1971):1211-1222 in Dahl, *op. cit. infra.*

C.C. Buehl and S.I. Pyle, "The Use of Age at First Appearance of Three Ossification Centers in Determing the Skeletal Status of Children," *J. Pediatr.* 21 (1942):335-342.

S.M. Chapman, "Ossification of the Adductor Sesamoid Bone and the Adolescent Growth Spurt," *Angle Orthod.* 42 (1972):236-244.

E. Cheraskin and W.M. Ringsdorf, "Biology of the Orthodontic Patient: III Relationship of the Chronological Age and Dental Age in Terms of Vitamin C State," *Angle Orthod.* 42 (1972):56-59.

E. Dahl and Editorial Committee, "Essays Presented to Arne Bjork on his Sixtieth Birthday," *Tandlaegebladet/Danish Dent. J.* 75 (1971):1143-1340.

C.D. Flory, "Osseous Development in the Hand as an Index of Skeletal Development," *Monogr. Soc. Res. Child Dev.* 1(3) (1936):1-141.

S.M. Garn and C.G. Rohmann, "Communalities of the Ossification Centers of the Hand and Wrist," *Am. J. Phys. Anthropol.* 17 (1959):319-323.

K.C. Graves, "Timing of Facial Growth: A Study of Relation with Stature and Ossification in the Hand Around Puberty" (Abstr.), *Am. J. Orthod.* 65 (1974):320.

K.C. Graves and T. Brown, "Skeletal Ossification and the Adolescent Growth Spurt," *Am. J. Orthod.* 69 (1976):611-619.

L.J. Green, "The Interrelationships Among Height and Weight, and Chronological, Dental, and Skeletal Ages," *Angle Orthod.* 31 (1961):189-193.

W.W. Greulich and S.I. Pyle, *Radiographic Atlas of Skeletal Development of the Hand and Wrist* (Stanford, Calif.: Stanford University Press, 1959).

C.F. Hansman and M.M. Maresh, "A Longitudinal Study of Skeletal Maturation," *Am. J. Dis. Child.* 101 (1961):305-321.

F.E. Johnston, "The Concept of Skeletal Age," *Clin. Ped.* 1 (1962):133-144.

W.M. Krogman, "Physical Growth as a Factor in the Behavioral Development of the Child," *New Dimensions in Learning,* ed. W. Waetjen (Washington D.C.: Assoc. Supervision and Curric. Dev., 1962) 8-23.

W.M. Krogman, "Biological Timing and the Facio-Dental Complex," *J. Dent. Child.* 35 (1968):175-185, 328-341, 377-381.

W.M. Krogman, *Child Growth* (Ann Arbor: University of Michigan Press, 1972).

R.S.Nanda, "The Rates of Growth of Several Facial Components Measured From Serial Cephalometric Roentgenograms," *Am. J. Orthod.* 41 (1955):653-673.

R.C.A. Pileski, "A Study of the Relationship Between the Ulnar Sesamoid Bone and Maximum Mandibular Growth Velocity" (M.Sc. Thesis, Univeristy of Toronto, 1969). Loaned by courtesy of Dr. Donald Woodside.

R.C.A. Pileski, D.G. Woodside and G.A. James, "Relationship of the Ulnar Sesamoid Bone and Maximum Mandibular Growth Velocity," *Angle Orthod.* 43(1973):162-170.

S. Idell Pyle, Alice M. Waterhouse and W.W. Greulich, *A Radiographic Standard of Reference of the Growing Hand and Wrist* (Case-Western Reserve University Press. Distributed by Year Book Medical Publishers, Chicago, 1971).

L.H. Rothenberg, R. Hintz and M. Van Camp, "Assessment of Physical Maturation and Somatomedin Levels During Puberty, *Am. J. Orthod.* 71 (1977):666-677.

J.M. Tanner, *Growth at Adolescence* (Springfield Ill.: Thomas, 1955).

J.M. Tanner, R.H. Whitehouse and M.J.R. Healy, *A New System for Estimating the Maturity of the Hand and Wrist, with Standards Derived from 2000 Healthy British Children. Pt. II. Scoring System* (Paris: International Children's Center, 1962).

J.M. Tanner, R.H. Whitehouse, W.A. Marshall, M.J.R. Healy and H. Goldstein, *Assessment of Skeletal Maturity and Prediction of Adult Height (TW2 Method)* (New York: Academic Press, 1975)

T.W. Todd, *Atlas of Skeletal Maturation* (St. Louis: Mosby, 1937).

Lancaster Cleft Palate Clinic
24 North Lime Street
Lancaster, Pennsylvania 17602

Medicine and Surgery as Art or Craft: The Role of Schematic Literature in the Separation of Medicine and Surgery in the Late Middle Ages

DARREL W. AMUNDSEN

IT has often been said that in no other area is the harmony of head and hand more desirable than in medicine.[1] The validity of this statement is perhaps evident to many, but tendencies to disregard it or attempts to refute it have manifested themselves in Western philosophical, popular, and even medical literature from the Greco-Roman period to the present. The most spectacular result of a separation of the speculative from the practical, the cerebral from the manual, is the dichotomy between medicine and surgery that is usually thought to have developed first in northern Europe in the late middle ages, and to have found its most extreme expression at the University of Paris.

It is my purpose in this paper to make some brief observations on the relations of medicine and surgery in classical antiquity and in the early Middle Ages and then to discuss the possible role of late medieval schematic literature in the separation of medicine and surgery in northern Europe.

The Council of Béziers, a regional council of 1310, is interesting for its choice of terms. The rubric to canon 13 reads: "Against those who perform the function of surgery." The text reads: "Since, owing to the dangers that frequently occur in the practice or exercise of the art of medicine, religious or presbyters, especially those holding an ecclesiastical benefice, ought not to enter into the exercise or practice of this art, or publicly perform the function of doctors, or join in secular affairs, we accordingly decree and command..." This canon ends with the statement that those who seek and obtain a special dispensation to practice are exempt from this

---

An abbreviated version of this essay was read at the 50th Annual Meeting of the American Association for the History of Medicine, at Madison, Wisconsin, May, 1977, under the title "Medieval Schematic Literature and the Separation of Medicine and Surgery."

My colleague, Professor LeRoy Dresbeck, suggested this study; I thank him for his kind advice and expert guidance.

1. E.g., B. Farrington, "The Hand in Healing: A Study in Greek Medicine from Hippocrates to Ramazzini," in *Head and Hand in Ancient Greece* (London: Watts, 1947), 54; A. C. Crombie, *Augustine to Galileo: The History of Science A.D. 400-1650* (Cambridge, Mass.: Harvard University Press, 1955), 197.

prohibition.[2] Introduced by a rubric using the expression *"officium chirurgiae"* (the function of surgery), the text then speaks of the dangers that occur in the practice or exercise *"artis physicae"* (the art of medicine — literally, the art of "physic") and of the *"officium medicorum"* (function of physicians). This flexibility of usage reveals an ambiguity probably reflective of popular confusion in respect to professional, ideological or, in this context, perhaps even functional distinctions between the practice of medicine and surgery. In order to explain more fully the conditions that led to this type of semantic confusion, a brief description of the previous relations of medicine and surgery in the Greco-Roman and early medieval eras must be given.

Generally, in the Greco-Roman world there was no apparent professional or ideological division in the medical profession between the physician and the surgeon. The Hippocratic Corpus includes treatises on surgical theory and practice, making no distinctions between medicine and surgery other than that of function. Non-medical authors clearly envisioned the competent physician, ἰατρός or *medicus,* as having in his purview the entire spectrum of the healing arts. Both Plato and Aristotle list the general areas of a physician's knowledge as including drugs, dietetics and surgery,[3] and in a literal and metaphorical sense the physician was frequently referred to as applying the knife or cautery.[4] Medical authors were emphatic in their insistence that surgery was an

---

2. J. D. Mansi, et al., *Sacrorum conciliorum nova et amplissima collectio,* new edition. (Florence and Venice, 1759-1798), vol. 25, col. 363: "Contra exercentes officium chirurgiae: Cum propter pericula quae in practica sive exercitio artis physicae frequenter occurrunt; religiosi vel presbyteri, praesertim ecclesiastica beneficia obtinentes non debeant se ingerere ad exercitium seu practicam dictae artis, nec publice exercere officium medicorum, nec saecularibus negotiis se immiscere, idcirco statuimus et mandamus sub poena interdicti, quam in contrarium facientes, monitione praemissa, in his scriptis, quod nullus presbyter nullusve religiosus amodo se ingerat ad exercitium sive practicam dictae artis, nec officium exerceat medicorum, absque speciali licentia a nobis petita et obtenta, nisi quatenus hoc eisdem permittitur per canonicas sanctiones."

The Catholic Church has been accused of causing or at least contributing to the separation of medicine and surgery, by, e.g., A.D. White, *A History of the Warfare of Science with Theology in Christendom* (1896, reprinted, New York: Dover, 1960) vol. II, pp. 31 f.; T.C. Allbutt, *The Historical Relations of Medicine and Surgery to the End of the Sixteenth Century* (London: Macmillan, 1905), 21; W.S.C. Copeman, *Doctors and Disease in Tudor Times* (London: Dawson's of Pall Mall, 1960), 6; J.F. Eustace, "The Dublin Guild of Barber Surgeons," *Industrial Medicine and Surgery* 32 (1963): 449. The arguments of these scholars are based upon a serious misreading of the relevant texts of medieval canon law and their use of the maxim *Ecclesia abhorret a sanguine,* i.e., "The Church abhors the shedding of blood," which C.H. Talbot *(Medicine in Medieval England* [London: Oldbourne, 1967], 55) has shown to be "a literary ghost." See Darrel W. Amundsen, "Medieval Canon Law on Medical and Surgical Practice by the Clergy," *Bulletin of the History of Medicine* 52 (1978): 22-44.

3. E.g., Plato, *Republic,* 406 D; Aristotle, *Nicomachean Ethics,* 1137 a.

4. E.g., Isocrates, *On the Peace,* 40; pseudo-Demosthenes, *Against Aristogeiton,* 1, 95; Cicero, *Epistolae ad Atticum,* 4, 3, 3; Seneca, *De Beneficiis,* 2, 18, 8.

essential part of medicine,[5] and many physicians in antiquity combined in their own practice a high degree of proficiency in both medicine and surgery. In neither Greek nor Roman law[6] was there any distinction, legal or semantic, between the different areas of medical specialty.

There are a few curious statements that could throw doubt on this picture of unity, e.g., the stipulation in the so-called Hippocratic Oath that the physician will not employ the knife for operations for stone, but will leave this procedure for the craftsmen who undertake such procedures.[7] But recent scholarship has shown that the so-called Hippocratic Oath is almost entirely atypical of ancient medical practice.[8] There is also the enigmatic statement of Galen that (as it is usually paraphrased), upon his return to Rome, he surrendered most of his practice of surgery to those called surgeons.[9] This has been thought to indicate that a distinct separation of medicine and surgery had taken place.[10] Galen's comment, however, occurs in the context of a discussion of trephining. He remarks that he might have attempted such operations if he were still living in Asia. But while practicing in Rome "he concurred with the custom of leaving most of this kind of work (τῶν τοιούτων ἔργων) to the so-called surgeons. This kind of work, in my opinion, refers to trephining and other complicated operations in which he had no training. It does not refer to surgery in

---

5. Scribonius Largus, *Compositiones,* 200; Celsus, *De medicina,* pr. 9.

6. See Darrel W. Amundsen, "The Liability of the Physician in Roman Law," in *International Symposium on Society, Medicine and Law,* edited by H. Karplus (Amsterdam, London and New York: Elsevier, 1973): 17-31, and "The Liability of the Physician in Classical Greek Legal Theory and Practice," *Journal of the History of Medicine and Allied Sciences* 32 (1977): 172-203.

7. Another possible meaning could be not to operate, not even for stone. The reference to "craftsmen" should not be taken to indicate that the author(s) of this oath considered the physicians for whom this oath was intended to be distinct professionally, rather than just functionally, from such craftsmen. Physicians were generally referred to and referred to themselves as craftsmen in Classical Greece. See Owsei Temkin, "Greek Medicine as Science and Craft," *Isis* 44 (1953): 213 ff, and Louis Cohn-Haft, *The Public Physicians of Ancient Greece,* Smith College Studies in History, Vol. 42 (Northampton, Mass.: Department of History of Smith College, 1956), 15 ff.

8. Ludwig Edelstein, "The Hippocratic Oath: Text, Translation and Interpretation," in *Ancient Medicine,* edited by Owsei and C. Lilian Temkin (Baltimore: Johns Hopkins University Press, 1967), 4 ff. Against Edelstein's thesis of the Pythagorean origin of the Oath, see Fridolf Kudlien, "Medical Ethics and Popular Ethics in Greece and Rome," *Clio Medica* 5 (1970): 91-121, and Karl Deichgraeber, *Der hippokratische Eid* (Stuttgart: Hippokrates-Verlag, 1955).

9. Galen, K. X, 454 f.

10. E.g., by George Sarton, *Galen of Pergamon* (Lawrence, Ka.: University of Kansas Press, 1954), 58; T.C. Allbutt, *Greek Medicine in Rome,* (1921, reprinted New York: Blom, 1970), 444; H.P. Bayon, "The Masters of Salerno and The Origins of Professional Medical Practice," in *Science, Medicine and History: Essays on the Evolution of Scientific Thought and Medical Practice Written in Honour of Charles Singer,* edited by E.A. Underwood (London: Oxford University Press, 1953) I:206.

general."[11] Both in Greek and Latin the words translated as surgeon appear to indicate function rather than professional or ideological distinction, and are used to describe the physician qua surgeon rather than surgeon qua surgeon. The physician, ἰατρός or *medicus,* was sometimes referred to as χειρουργός or *chirurgus* while performing a manual operation or by virtue of his choice of specialty in surgery.

I have found no evidence that there was at any time in classical antiquity any special stigma attached to the physician qua surgeon.[12] I have seen nothing that would lead me to believe that professional strife then existed along the lines of medicine versus surgery. The following statement by Plutarch seems faithful to both professional and popular attitudes: "Nor among physicians do dieticians envy surgeons; they even call each other into consultation and praise one another."[13]

In the early middle ages a new element was introduced into the medical scene: clerical medicine, practiced by both monastic and secular clergy.[14] The emphasis in clerical sources on clerical medical practice can create the impression that lay medical practice had virtually died out during the early middle ages but there is ample evidence to prove that a distinct lay medical profession did continue to exist.[15]

There is no evidence to indicate that in the early middle ages there was any tendency to separate practitioners of surgery from other medical practitioners. The majority of the source material that touches on medical practice during this period is concerned with exploiting the anecdotal value of unusual medical treatment, especially that given by members of the clergy. The story by Paulus

---

11. Personal correspondence from Dr. Owsei Temkin, for whose help I am most grateful.

12. When the physician was maligned as an "unpunished killer," it was usually in his use of drugs (φάρμακα or *venena* — both words having the double meaning either of drugs or poison), not as a shedder of blood. See Darrel W. Amundsen, "Romanticizing the Ancient Medical Profession: The Characterization of the Physician in the Graeco-Roman Novel," *Bulletin of the History of Medicine* 48 (1974): 320 ff, and "Images of Physicians in Classical Times," *Journal of Popular Culture* 11 (1977): 642-655. Not that the physician qua surgeon was not subject to abuse by wits or raconteurs, e.g., by Palladas in the *Greek Anthology* (11, 280), who writes that it is better to be given a sentence of death by a judge "than to fall into the hands of the surgeon Gennadius (τοῦ χειρουργοῦ Γενναδίου). For the former executes murderers in just hatred, but Gennadius takes a fee for sending you down to Hades." See also Callicter, *ibid.,* 11, 121.

13. *Moralia,* 486 C.

14. There was an active effort by authors of various monastic *regulae* (e.g., Benedict and Cassiodorus) to ensure that certain monks be qualified to render medical assistance to their brothers.

15. E.g., in the writings of Gregory of Tours. In legal sources we find regulations governing lay practitioners. See, e.g., Darrel W. Amundsen, "Visigothic Medical Legislation," *Bulletin of the History of Medicine* 45 (1971): 553 ff.

Diaconus of the performance by Bishop Paul of Merida of a laparotomy for a retained fetus in an ectopic pregnancy shows that Bishop Paul, termed a skilled *medicus,* functioned, at least in this instance, as a physician qua surgeon.[16] Likewise, in Visigothic law, the regulations governing physicians, *medici,* mention two surgical procedures, phlebotomy and removal of cataracts.[17] In other codes of the so-called *leges barbarorum* there is occasional mention of forensic medicine, usually in respect to wounds and other injuries, and the term *medicus* is always used to designate the medical practitioner.

It would be virtually impossible to determine with any degree of accuracy when a semantic distinction developed between physician qua physician and surgeon qua surgeon as descriptive of profession rather than of function. It is reasonable to say that in the early middle ages the term *chirurgus* was rarely used outside strictly medical texts.[18] But ambiguity is inherent in the terms employed. Just as we now use the word doctor to indicate either a physician or a surgeon or a man who functions as both, so also in the early middle ages the term *medicus* was used.[19] In the Assizes of the Latin Kingdom of Jerusalem we find regulations governing both medical and surgical practice, with no terminological distinction between the practitioners.[20] Gratian speaks of castration resulting from operations for dropsy performed by a physician (*medicus,* not *chirurgus*) or barber.[21]

This reference by Gratian to surgery performed by a barber is one of the earliest that I have seen and does bring us to a significant point. Before the advent of medical licensure in the Western world, the first instance being in 1140 under Roger II of Sicily,[22] anyone who wished might practice medicine, including surgery. In the Greco-Roman world there also had been no restrictions on who might call himself a physician and assume the treatment of patients. The occasional outcries against this laxity were unavailing. Without medical licensure

---

16. *De vita patrum Emeritensium,* 4, P. L., 80, col. 128 ff. This story also probably indicates that such a procedure had become relatively uncommon.

17. Amundsen, "Visigothic Medical Legislation," (*supra,* n. 15, pp. 560 ff.)

18. D. de Moulin, "Cutting for Stone in the Early Middle Ages," *Bulletin of the History of Medicine* 45 (1971): 78.

19. One occasionally encounters the term *physicus* which seems to have designated a physician as opposed to surgeon (in the late middle ages) in some contexts while in others it implies no such limitation, as in canon 13 of the Council of Béziers (*supra,* n. 2).

20. Darrel W. Amundsen, "The Medical Legislation of the Assizes of Jerusalem," in *Proceedings of the XXIII Congress of the History of Medicine* (London: Wellcome Institute, 1974), 517 ff. The old French word *miege* refers both to the practitioners of medicine and surgery in this code.

21. *Decretum,* 1, 55, 7 ff.

22. Although the earliest may have been in the Latin Kingdom of Jerusalem. See Amundsen, "The Medical Legislation of the Assizes of Jerusalem," (*supra,* n. 20, pp. 519 f.)

there can be little effective control of medical education. There is, for example, a spectacular difference between Galen, who studied at various centers of medical education for twelve years before commencing practice, and a quack such as the notorious Thessalus, living under the reign of Nero, who claimed that he could turn anyone, a cook, dyer, cobbler, weaver or fuller, into a qualified *medicus* in six months.[23] We know of centers of medical education, often misleadingly called medical schools, at Laodicea, Smyrna, Pergamon, Corinth and Alexandria, the latter enjoying the highest reputation.[24] But alongside these there existed the apprenticeship system, by which a physician would take students who would learn from him in a practical manner the skills of the medical art.[25] In the early middle ages this was the predominant method of medical education for the lay medical practitioner. With the absence of any training other than apprenticeship available generally for the lay practitioner,[26] we find that before the tenth century various groups of specialists developed, such as peripatetic lithotomists, ophthalmologic surgeons, herniotomists, and "wound men." Even though our source material for the Greco-Roman world is much more extensive than for the early middle ages, there is surprisingly little reference to these types of practitioners in classical antiquity. But by the tenth century we find them appearing in our sources with some frequency. Probably their emergence was due primarily to the functional if not ideological abandonment of most surgical practice by many clerical and other lay medical practitioners. Medical and surgical knowledge and proficiency undoubtedly diminished during the early middle ages, and the gradual partial abandonment of surgical practice by many physicians was probably due in great part to their lack of knowledge and skill, at least with respect to the more difficult procedures. There was ample room for the adventuresome surgical specialist. Some surgical procedures were done by the barbers, at first probably as a sideline and eventually as their primary function.[27]

We have much information about the medical instruction available to clerics in the early middle ages. But there is frequent confusion as to what was part of the general liberal arts curriculum of the cleric and what was intended specifically for persons who were specializing in medicine in order to practice.

---

23. Galen, K. I, 83, and X, 4 ff.

24. M.L. Clarke, *Higher Education in the Ancient World* (London: Routledge and Kegan Paul, 1971), 110.

25. We find such a system in the anonymous *Apollonius, Prince of Tyre,* for which see Amundsen, "Romanticizing the Ancient Medical Profession," (*supra,* n. 12, pp. 326 f.)

26. There is occasional reference to physicians in the West who had been trained in Constantinople, but this was probably quite rare.

27. Not all of these specialists were necessarily charlatans and quacks; e.g., the lithotomists operating in southern Netherlands during the tenth century. See de Moulin (*supra,* n. 18), p. 78.

There are many examples of clerics who had a strong theoretical background in medicine, acquired partly during formal education and supplemented by subsequent private reading. An example is Gerbert, later Pope Sylvester II (late tenth century), whose correspondence includes occasional medical references. One letter illustrates an attitude that was probably common among educated clerics: "Do not ask me to discuss what is the province of physicians, especially because I have always avoided the practice of medicine, even though I have striven for a knowledge of it."[28] Even those who had devoted much of their advanced education to the study of medicine might never practice. Richer of Rheims (tenth century) devoted great attention to the study of medicine, first at Rheims and then at Chartres; his studies included pharmacology, pharmacy, botany, and surgery. There is no evidence that he ever practiced medicine, and it is obvious that his major concern was with the theoretical rather than the practical.[29] Men such as these were the product of a tradition dating back to classical antiquity. Aristotle had divided physicians into three categories: mere craftsmen, masters of the art, and cultivated laymen who had studied medicine as part of their general education.[30] The importance of a basic knowledge of medicine was frequently stressed in classical antiquity,[31] although medicine was not a formal part of regular education.

The desire to systematize knowledge, to group all its sundry areas into complex schemata, was present in classical antiquity. From the time of the sophists the branches of knowledge considered requisite for freemen were astronomy, geometry, arithmetic, music, and grammar. Varro (first century B.C.) wrote an encyclopedia titled *Disciplinae,* divided into nine books devoted to grammar, dialectic, rhetoric, geometry, arithmetic, astrology, music, medicine, and architecture. In the fifth century A.D., Martianus Capella composed his *De Nuptiis Philologiae et Mercurii (Marriage of Philology and Mercury)*, [32] an

---

28. *The Letters of Gerbert with His Papal Privileges as Sylvester II,* translated by H.P. Lattin (New York: Columbia University Press, 1961), 188.

29. Loren C. MacKinney, "Tenth-Century Medicine as Seen in the *Historia* of Richer of Rheims," *Bulletin of the Institute of the History of Medicine* 2 (1934): 349.

30. *Politics,* 1282 a.

31. E.g., Plutarch, *Moralia,* 122 E; Aulus Gellius, *Noctes Atticae,* X, 8.

32. There is ample literature on the influence of Martianus Capella. A convenient summary is provided by William H. Stahl, "To a Better Understanding of Martianus Capella," *Speculum* 401 (1965): 102-115.

encyclopedia comprising only the first seven arts discussed by Varro.[33] These became stabilized as the seven liberal arts, those essential for a *liber,* i.e., a free man. Training in the technical arts was not included among the seven.[34]

The popularity of Martianus Capella during the early middle ages was great. His system received support by such authorities as Cassiodorus (sixth century) who, wishing to give his monks a summary of the worldly sciences, devoted seven chapters of his *Institutiones divinarum et saecularum lectionum* to the seven liberal arts and included a separate section on medicine because of its utility. Later, under Charlemagne, Alcuin divided the seven liberal arts into the *trivium* and *quadrivium,* the backbone of medieval education. But the *trivium* and *quadrivium* were not an isolated system. They were an integral part of the Platonic and, later, the Augustinian schema, the *trivium* (grammar, rhetoric and dialectic) being a subdivision of logic and the *quadrivium* (geometry, arithmetic, astrology and music) a subdivision of physics. In the Platonic-Augustinian[35] schema all knowledge considered worthy of the name was grouped under the general heading of philosophy. Philosophy itself was divided into three major areas: physics, ethics, and logic. A competing classificatory system, the Aristotelian, divided philosophy into four areas: theoretical, practical, logical, and mechanical. In the Aristotelian scheme medicine was a subdivision of physics, which in turn was a part of theoretical philosophy.[36] In the Platonic-Augustinian schema it was also a subdivision of physics, which was one of the three major divisions of philosophy.

In the early middle ages the position of medicine in the various schemata varied from writer to writer, sometimes even within different works of the same author, e.g., Isidore of Seville (sixth-seventh century) wrote: "They say seven disciplines pertain to physics: arithmetic, geometry, music, astronomy, astrology,

---

33. In this allegorical wedding, Mercury gives to his bride, Philology, seven beautiful handmaidens, the liberal arts. Apollo explains the absence of architecture and medicine by remarking that they are too occupied with mundane matters and are out of place at a heavenly wedding since they have nothing in common with the gods' lives. One should be cautious in seeing a derogation of medicine here, as John M. Riddle nicely points out ("Theory and Practice in Medieval Medicine," *Viator* 5 (1974): 159 f., and n. 11).

34. An intellectual prejudice against manual work in classical antiquity is well-known. Although in somewhat muted form, this appears in some early Christian authors, e.g., Jerome (fourth century) who groups grammar, rhetoric, philosophy, geometry, dialectic, music, astronomy, astrology and medicine together as most useful for men and then speaks of the arts that are performed manually, without much need for reason: agriculture, carpentry, etc. (*Epistles,* 53, 6).

35. Also known as the Stoic or Boethian classification.

36. It should be noted that, owing to the loss of the Aristotelian Corpus for the early middle ages, Aristotle's influence was slight and only indirect until the Latin West was reacquainted with his works in the twelfth century.

mechanics and medicine."[37] Elsewhere he says that "the ancients enumerated seven divisions of philosophy" and then names the same seven that he had placed under physics.[38] These seven disciplines, grouped together so frequently in the early middle ages, were simply the *quadrivium* plus astrology, mechanics,[39] and medicine. In the late seventh century, Aldhelm of Malmesbury included Isidore's seven disciplines under the rubric of grammar and philosophy,[40] Rabanus Maurus restored the seven to physics,[41] and in the ninth century Ermenrich of Ellwangen gave the same categorization.[42]

During the ninth century, there begins to be a tendency toward speaking of the mechanical arts *(artes mechanicae)* in juxtaposition to the liberal arts.[43] Mechanics is dropped from its place in what had become the standard subdivision of physics,[44] but medicine remains. The first threat to the place of medicine as a

---

37. *De differentis rerum,* P. L., 83, col. 94: Ad physicam pertinere aiunt disciplinae septem, quarum prima est arithmetica, secunda geometria, tertia musica, quarta astronomia, quinta astrologia, sexta mechanica, septima medicina.

38. *Liber numerorum qui in sanctis scripturis occurrunt,* P.L., 83, col. 188: Septem apud veteres annumerantur genera philosophiae, prima arithmetica, secunda geometria, tertia musica, quarta astronomia, quinta astrologia, sexta mechanica, septima medicina.

39. The inclusion of mechanics is not inconsistent with classical thought. As a subdivision of physics, mechanics was probably viewed as theoretical rather than manual. Typical of this attitude was Pappos of Alexandria (third-fourth century): "Hero (of Alexandria, first century A.D.) felt that there were two parts of mechanics: one is reason and the other depends on the work of the hands. The rational part consists of geometry, arithmetic, astronomy and physics; the manual consists of metal work, building, tectonics and painting. . ." (Latin text in Peter Sternagel, *Die artes mechanicae im Mittelalter: Begriffs-und Bedeutungsgeschichte bis zum Ende des 13. Jahrhunderts,* Münchener historische Studien Abteilung mittelalterliche Geschichte, Band 2 [Kalmünz über Regensburg: Lassleben, 1966], p. 31).

40. *De virginitate,* M.G.H., Auct. ant., XV, p. 277: Igitur consummatis grammaticorum studiis et philosophorum disciplinis quae VII speciebus dirimuntur, id est arithmetica, geometria, musica, astronomia, astrologia, mechanica, medicina....

41. *De rerum natura,* P.L., 111, col. 413: Dividitur autem physica in septem partes, hoc est, arithmeticam, astronomiam, astrologiam, mechaniam, medicinam, geometriam et musicam.

42. *Epistola ad Grimaldum,* M.G.H., EE, V, p. 541: Item physica dividitur in arithmeticam, astronomiam, astrologiam, mechanitiam, medicinam, geometricam, musicam.

43. First by John the Scot Erigena, *Annotationes in Marcianum,* edited by C.E. Lutz (Cambridge, Mass.: The Mediaeval Academy of America, 1939), 74. Remigius, towards the end of the ninth century, in his commentary on the *De Nuptiis Mercurii et Philologiae,* writes that the seven liberal arts are called liberal because they are directed toward a mind that is free of mundane troubles. He distinguishes the liberal arts from the practical arts and the mechanical arts. Although he says there are seven mechanical arts, he does not name them. But of the practical arts he says: "Architectonica et medicina et ceterae quae magis in experientia quam in ratione constant." See Cora E. Lutz, "Remigius' Ideas on the Classification of the Seven Liberal Arts," *Traditio* 12 (1958): 78 f. and nn. 75 and 76.

44. Sternagel (*supra,* n. 39, pp. 40 ff.).

part of theoretical education, secure through its propinquity to philosophy through the link of physics, was in Adelard of Bath's *In elementa Euclidis praefatio:* "Science is divided into wisdom and eloquence; eloquence into grammar, dialectic and rhetoric; wisdom into the theoretical and practical; the practical into ethics, mathematics and the liberal-practical. . . Mathematics is divided into fabric making, armament, commerce, agriculture, hunting, medicine, and theatrics. . ."[45]

Although Adelard's inclusion of medicine under the rubric of mathematics along with these six new colleagues was an anomaly, through the agency of Hugh of St. Victor the union between medicine and these mechanical companions was to last for a century. Hugh wrote his *Didascalicon*[46] in the late 1120s in Paris.[47] Using the principle that all areas of knowledge important to men are essentially integrated among themselves, Hugh composed this work as a basic orientation for students at the open school of the newly founded Abbey of St. Victor.[48] In contrast to the tripartite Platonic-Augustinian division of philosophy, Hugh's scheme was distinctly Aristotelian: ". . .there are four branches of knowledge only, and . . .they contain all the rest; they are the theoretical, which strives for the contemplation of the truth; the practical, which considers the regulation of morals; the mechanical, which supervises the occupations of this life; and the logical, which provides the knowledge necessary for correct speaking and clear argumentation."[49] The area labeled "mechanical" constituted an essential part of his system, standing beside the "work of God" and the "work of nature" as "the work of the artificer who imitates nature."[50] In their utility, by repairing the physical weaknesses of fallen men, the mechanical arts serve the philosophical quest. But their position is clearly subordinate: ". . . certain [arts] are both *in* the search for the True and *for* the search for the True . . . the mechanical arts are developed philosophically but they are not *about* philosophy nor are they *for* it."[51]

After listing the seven mechanical arts (fabric making, armament, commerce, agriculture, hunting, medicine, and theatrics) Hugh writes: "These sciences are

---

45. Latin text in Sternagel (*ibid., p. 41*).

46. An English translation by Jerome Taylor was published by Columbia University Press in 1961. All references to the *Didascalicon* are by page number in Taylor's translation.

47. P. 158, n. 1.

48. Founded in 1108 by William of Champeaux.

49. P. 60.

50. P. 27.

51. From his *Epitome Dindimi in philosophiam,* as quoted by Taylor, *ibid., p. 15.*

called mechanical, that is, adulterate,[52] because their concern is with the artificer's product, which borrows its form from nature. Similarly, the other seven are called liberal either because they require minds which are liberal, that is, liberated and practiced (for these sciences pursue subtle inquiries into the causes of things), or because in antiquity only free and noble men were accustomed to study them, while the populace and the sons of men not free sought operative skill in things mechanical. In all this appears the great diligence of the ancients, who would leave nothing untried, but brought all things under definite rules and precepts. And mechanics is that science to which they declare the manufacture of all articles to belong."[53] Hugh then devotes a separate chapter to each of the seven mechanical arts. The section dealing with medicine reads, in part, as follows: "Every medicinal operation is either interior or exterior. The interior are those which are introduced through the mouth, nostrils, ears, or anus, such as potions, emetics, and powders, which are taken by drinking, chewing, or sucking in. The exterior are, for example, lotions, plasters, poultices, and surgery, which is twofold: that performed on the flesh, like cutting, sewing, burning, and that performed on the bone, like setting and joining."[54]

Although the *Didascalicon* was part of a long tradition of schematically conceived didactic literature, "yet it provides a new synthesis of the materials, a synthesis remarkable for its originality and its wholeness."[55] Its popularity was immediate and the influence that it exerted on philosophical and educational attitudes was immense.[56] Although the division of the seven mechanical arts did not claim to be exhaustive or organic, it was accepted almost universally.[57] There

---

52. This term is based on a rather fantastic etymology, confusing "mechanical," derived from μηχανή, machine, with μοιχός (Latin *moechus*) which means adulterer. Compare Martin of Laon (ninth century), *Scholia graecarum glossarum:* " '*Moechus*' means adulterer, a man who secretly pollutes the marriage bed of another. From '*moechus*' we call 'mechanical art' any object which is clever and most delicate and which, in its making or operation, is beyond detection, so that beholders find their power of vision stolen from them when they cannot penetrate the ingenuity of the thing." Quoted from Taylor, *supra,* n. 46, p. 191, n. 64, as translated by M.L.W. Laistner, "Notes on Greek from the Lectures of a Ninth Century Monastery Teacher," *Bulletin of the John Rylands Library* 7 (1922-3): 439.

53. P. 75.

54. P. 78. Taylor, p. 207, nn. 75-78, shows that the entire section on medicine was taken from the popular *Isagoge* written by the ninth-century Syrian-Arabic physician Hunain ibn Ishāq, known in the West as Joannitius.

55. P. 4.

56. P. 4: "A crude index of its influence on its own and subsequent ages can be seen in its survival in nearly a hundred manuscripts of the twelfth through the fifteenth centuries, preserved in some forty-five libraries stretching across Europe from Ireland to Italy, from Poland to Portugal."

57. Sternagel (*supra,* n. 39, p. 41); Marie-Dominique Chenu, "Civilisation urbaine et théologie, L'École de Sainte-Victor au XIIe siècle," *Annales* 29 (1974): 1256.

were minor variations, e.g., the dropping of theatrics from the list and its replacement by *fabricatura* (manufacture)[58] or *pictura* (painting).[59] Where medicine was classified as a mechanical art, surgery, as we have seen in Hugh's *Didascalicon,* was considered as an integral part of it.

Did inclusion of medicine among the mechanical arts indicate depressed status of the former, or elevated status of the latter, or a combination of the two? The period was marked by the rise of widely varied commercial and professional activities. It was an era of great socio-economic change, reflected in many facets of society but particularly in the rise of the guilds and a concomitant increase in the status consciousness of the professions, from the legal and medical to the commercial and mechanical. The struggle for status within the medical profession centered on the contrast between medicine and surgery, and, in some respects, between the theoretical and the practical.

The didactic, systematizing literature of the thirteenth century tended to remove medicine from its association with the mechanical arts.[60] Surgery appeared in its place. An early example is Radulfus de Longo Campo, who wrote (c. 1216) a work that, to the best of my knowledge, had never been published. The treatise of Radulfus has been discussed by Martin Grabmann[61] who, by a study of the manuscript, produced a thorough schema illustrative of Radulfus' system,[62] in which all knowledge is divided into four categories: eloquence, philosophy, literature, and mechanics. Philosophy is divided into theoretical and practical. The theoretical is subdivided into theology, mathematics, and physics. Physics is divided into elemental, celestial, and terrestial; under the latter is medicine, divided into theoretical and practical. The fourth division of knowledge, mechanics, is subdivided into fabric making, armament, commerce, navigation, theatrics, agriculture, surgery, "and similar things, of which there is an infinite

---

58. Gottfried of St. Victor, *Microcosmus* I, 57: Et mechanice quidem scientie species cum sint multe, septem nobis enumerare sufficiat: prima armatura, secundo mercatura, tercia agricultura, quarta fabricatura, quinta lanifactura, sexta venatura, septima medicatura.

59. In an anonymous twelfth-century manuscript entitled *Tractatus quidam de philosophia et partibus eius,* quoted by Franco Alessio, "La filosofia e la 'artes mechanicae' nel secolo XII," *Studi Medievali,* Ser. 3, 6 (1965) 156 f: Sunt autem mechanice septem, quemadmodum et liberales: lanificium, venatio, navigatio, medicina, agricultura, armatura, pictura.

60. It should be noted that Hugh's classificatory system remained very influential and some authors of the thirteenth century continued treating medicine as one of the mechanical arts. For example Bonaventure follows him in this (*De reductione artium ad theologiam* 2) as does Robert Kilwardy (*De ortu scientiarum,* quoted by Sternagel [*supra,* n. 39, pp. 157 ff.]).

61. *Die Geschichte der scholastischen Methode,* 1941 (reprinted, Berlin: Akademie-Verlag, 1956), 2: 48 ff.

62. *Ibid.,* p. 52, n. 3.

variety." This arrangement was also adopted by Vincent of Beauvais and Berthold of Regensburg.[63] Albertus Magnus, in his commentary on Aristotle's *Metaphysics,* asserts that a difference between the arts is the way in which they are admired. He then proceeds to say that certain arts are necessary or useful for civil life; examples are manufacture, wool work, architecture, baking, agriculture, and surgery.[64] In the schemata of Radulfus and of those who had adopted his classification, medicine had returned to its position as a division of physics and surgery had taken its place as a mechanical art. This attitude is manifest in the medical universities of northern Europe.

Much has been written about medical education in medieval universities, and it is not necessary to repeat existing studies of the influence of the medieval universities in such areas as medical professionalism and medical licensure. It should be noticed, however, that in attempts to identify the causes of the separation of medicine and surgery, there has been a tendency to blame the northern medieval universities, especially the University of Paris. The University of Paris and other northern universities did a great deal to deepen and perpetuate the division, but did not create it and did not create a climate favorable to the dichotomy. The causes are many and complex. One of the major stimuli may have been the extensive influence of the didactic literature of the twelfth century, particularly that of Hugh of St. Victor and his imitators and adapters, in which medicine is placed among the mechanical arts. In their quest for status, for recognition of the philosophical and theoretical basis for the teaching and study of medical science, in their fight for acceptance as scholars of a liberal discipline worthy of inclusion in the university, the medical professors reacted against the derogation of medicine expressed in its association with the mechanical arts. The most obvious way in which medical science could free itself from this association was by separation from the part of its art that had its practice most closely tied to the manual; this, of course, was surgery, its operative branch. Radulfus had divided medicine, as a subdivision of physics, into the theoretical and the practical.[65] And in medicine, as distinct from surgery, even the practical aspect could be cerebral; dirtying of the hands could be avoided, and status could be

63. Sternagel (*supra,* n. 39, p. 101).

64. *Ibid.,* p. 106.

65. This, of course, was not unique to Radulfus. As discussed above (pp. 6 f.), the recognition of the theoretical and practical aspects of medicine had its roots firmly embedded in classical soil and the appeal of a strictly theoretical pursuit of medicine was very strong in some quarters during the middle ages.

preserved.[66] We have many prejudiced comments against the lofty physicians of the universities, particularly of Paris, who, we are told, would not even deign to visit a patient, but, through the medium of a runner, would look at a urine specimen, diagnose the illness, and prescribe treatment. In teaching abstractions they also treated abstractions. Although this is probably an exaggeration, it undoubtedly contains much truth. There was also an element of safety in theory and abstract treatment, and this security was not available to the surgeon. As George Sarton wrote: "After all a surgeon cannot get away with a shibboleth; he must work with his hands — and hands are far more honest than brains, one cannot fool them, nor induce them to pretend. They work or they do not, and the results of their actions are not far remote. There is no chance of bluffing, and mistakes are paid for in cash."[67]

It would obviously be myopic to consider the influence of the didactic tradition as the sole force behind the separation of medicine and surgery. But the influence of this genre on the university has its correlate in the direct and indirect influence of the university on the didactic literature. The writings of Hugh of St. Victor and his followers probably stimulated the exclusion of surgery from medicine in the fledgling universities of the North, and it is reasonable to assume that this division may also have affected the various schemata of the thirteenth century.

---

66. And it could be hoped by the status-conscious academic physicians that their relationship with the practical could be kept at a minimum. But Radulfus' simple division of medicine into the theoretical and the practical was too facile for some deeper thinkers such as Thomas Aquinas, who questioned such a superficial division, writing that it "is made on the basis of whether what is studied in medicine is proximate to or remote from practice." Such a division, he maintains, is incorrect since it is not on the basis of the end *(The Division and Methods of the Sciences [Questions V and VI of His Commentary on the De Trinitate of Boethius]*, trans. by Armand Maurer [Toronto: The Pontifical Institute of Mediaeval Studies, 1963], p. 14). Nor, in Thomas' opinion, is medicine "contained under physics as a part, for the subject of medicine is not part of the subject of natural science from the point of view from which it is the subject of medicine." Thus "medicine is sub-alternated to physics, and for the same reason too are alchemy, the science of agriculture, and all sciences of this sort" (*ibid.*, p. 15). In other schematic literature the classification of medicine was sometimes both complex and obscure, for example in the *Arbor Scientiarum* of Henry of Langenstein (late fourteenth century). Henry divides philosophy into the theoretical and the practical. Medicine appears under both rubrics. Theoretical philosophy is divided into the supernatural and the human, the human into the locutional and the real, the real into the abstract and the natural, and the natural into the universal (i.e., natural philosophy) and the particular (i.e., medicine). Practical philosophy likewise is divided into the supernatural and the human, the human into the locutional and the real, the real into the abstract and the natural, the natural into the universal (i.e., medicine [a type falling midway between the theoretical and practical branches of particular philosophy] and alchemy) and the particular (i.e., medicine in its [practical] curative, pharmaceutical, surgical and empirical aspects). See Nicholas H. Steneck, "A Late Medieval *Arbor Scientiarum*," *Speculum* 50 (1975): 250-51 and 256.

67. *Introduction to the History of Science* (Baltimore: William and Wilkins, 1931) 2: 73.

Until the early twelfth century, medicine was considered part of liberal education; in schematic literature it appeared as a subdivision of physics. Great socio-economic change during the eleventh century gave rise to growing appreciation of the mechanical in some quarters, and schematists began to speak of the mechanical arts as complementary to the liberal arts. In the early twelfth century, with a view toward its practical utility, medicine was removed from its place as a subdivision of physics and was classed as a mechanical art. The most influential exponent of this tendency, Hugh of St. Victor, wrote in Paris, and it was at the University of Paris, where medical education was most theoretically oriented, that the professional and ideological separation of medicine and surgery is first manifest. Probably this change was motivated in great part by a desire of the medical faculty to remove from their theoretical discipline the stigmata associated with the mechanical, and to restore its previous position as a subdivision of physics. That they were successful is apparent in the return of medicine to physics and its replacement by surgery as a mechanical art in much of the schematic literature of the thirteenth century.

Although the relations between medicine and surgery in the late middle ages have been the subject of extensive study, the causes of the dichotomy are not yet known completely. Scholars concerned with this problem have not sufficiently considered the possible influence of the schematic literature. Since the schematic literature of the twelfth century provided the matrix for the university curricula of northern Europe, this literature should be considered when the separation of medicine and surgery is investigated.

Foreign Language Department
Western Washington University
Bellingham, Washington 98225

The Case of the Quarrelsome Watchmen

THOMAS R. FORBES and JOAN L. VENES

EIGHTEENTH century accounts of the treatment of head injuries are scarcely numerous; it seems worthwhile to report a recently discovered case. The injury to be described occurred during an assault and ended fatally. Most of our information about the episode and about the persons involved derives from the record of the coroner's inquest and from a published account of the subsequent trial.[1]

The story begins about 3 A.M. on Sunday, 30 September 1781, in the City of London Parish of St. Botolph without Aldgate.[2] At that hour the streets were almost empty except for watchmen who, lantern and staff in hand, occupied their assigned stands — structures resembling sentry boxes designed for protection from the weather — or walked their beats on the lookout for trouble. This was before the days of a citywide police force. The guardians of the peace were untrained householders who took turns in discharging their nocturnal obligation to their wards.[3]

On this dark morning all was not well. Bad feelings had been increasing for some time between two of the watchmen and at last had boiled over. John Mulligan, on duty at his stand at No. 18 Aldgate High Street, heard a cry of "Watch!" from nearby Somerset Street. Hurrying in that direction, Mulligan met Robert Evans, also assigned to the area, who was carrying the two fragments of his broken watch staff. Asked what had happened, Evans responded, "Damn the old Scoundrel, I have broke my Stick over his Skull. He has affronted me several times before." Evans then continued on to his own stand at the corner of Black Horse Yard.

This publication was supported in part by NIH Grants LM 02494 and LM 02927 from the National Library of Medicine.

Transcripts of Crown-copyright records of the Greater London Record Office (Middlesex Records) appear by permission of the Controller of H.M. Stationery Office.

1. "Inquest on Joseph Driver." Manuscript. Greater London Record Office (Middlesex Records), 9 October 1781.
The Whole Proceedings on the King's Commission of the Peace, Oyer and Terminer, and Gaol Delivery for the City of London. London, Joseph Gurney, 17 October 1781 521-524.

2. Although the assault took place in the City, the victim died in the London Hospital, Parish of St. Mary Whitechapel, Middlesex, and the inquest was held in that parish.

3. Donald Rumbelow, *I Spy Blue* (London: Macmillan, 1971) 18.

The "old Scoundrel" was a third watchman, Joseph Driver, aged 60. Within the next hour Driver invited Mulligan and another member of the watch, Benjamin Pearce, to have a pot of beer with him at the London Apprentice, a public house near Whitechapel Church. Discipline must have been minimal; the men were not to go off duty until 5 A.M. Mulligan later testified that at the pub he saw no blood on Driver and that the latter said nothing about an injury or about what had happened.

Benjamin Pearce testified at the inquest that he had first encountered Driver shortly after 3 A.M. and that Driver had reproached Pearce for not coming to his help. This was the first Pearce had heard of trouble. Driver continued,

> 'Evans hath given me a Knock with his Staff and Broke his Staff over my Head' and pulled his Hat off and Put Informants hand and Bid him feel. That there was a swelling almost as big as a Pidgeons egg, a little above the Forehead, and a small Matter of Blood.

Pearce and Driver then went off to the London Apprentice for their beer,

> which They Drank standing . . . the Deceased talked hearty And the Chief of his Talk was that he would Serve Evans with a Copy of a Writ.

After the few minutes of relaxation, the men completed their tour of duty.

The watchmen of Portsoken Ward, in which St. Botolph Aldgate Parish was located, were supervised by one Jonathan Brown, the patrol or constable. He told the coroner's court of meeting Driver on that same dark morning of 30 September. Driver exhibited his injury and complained about Evans. Brown thereupon sought out and questioned the assailant. Evans' story was that he had heard talk at Driver's stand and went to see what was the matter; Driver told him that he had no business on that beat and three times pushed him off the pavement. Evans retaliated with a blow from his staff. The witnesses agreed that Driver "cried the hour of four and five" and then went off duty.

A woman who saw the fight — Driver had been lighting her home — testified that he not only had pushed Evans but had struck him three times with his hand. When Evans "prayed for peace," she said, "The deceased held up his staff, to strike him." After the blow with the staff, each man punched the other.

On Tuesday noon, 2 October, more than 48 hours after the altercation, Driver walked to the nearby London Hospital to seek help for his head injury. He was seen by James Furniss, surgical pupil to a Mr. Shepard. According to the student's testimony, the injured man appeared "perfectly sensible." Neither Furniss nor another pupil could find a swelling, extravasated blood, or any other sign of injury, and Driver was sent home.

On Friday of that week the watchman's wife and a parish beadle appeared at the hospital to report that the injured man was "out of his Senses." At this point

Sir William Blizard[4] directed that the injured man should be returned to the hospital. Driver was brought in at about 3 P.M. and was at once put to bed and examined. Blizard, Furniss testified,

> could not find any external Injury nor any Fracture or Fissure on the Skull. That he Opened a Temporal Artery and Order'd him to be Bled in the Arm to Sixteen ounces And to have a purging Glyster,[5] A Blister[6] between his Shoulders and his Head to be Shaved. That the Deceased lay from the time he came in a kind of Stupor. That Mr. Blizard came again in the Evening and about Ten o'clock he Scalped him. And after that he found a fracture on his Forehead through the Skull. That there were several Other pupils present besides Informant. That he was Trepan'd.[7] That under the Skull there lay some extravasated Blood on the Dura Mater. That the dura mater did not appear of its right shining Colour. Saith That he hath no doubt but that the Fracture was the Cause of death of the Deceased But cannot form any Judgment how it was Done. That if it had been known to be a Fracture at the first, Informant is of Opinion that the Deceased's Life might have been Saved. But he died at five o'Clock on Saturday morning.

The record of Evans' trial adds the further detail from Furniss that exposure of the skull showed the fracture to extend "quite down to the hollow of the eyes, through both the plates."

Evans was indicted for wilful murder and was brought to trial at the Old Bailey before Mr. Justice Nares on Wednesday, 17 October 1781, or perhaps a day or two later; the record is not exact.[8] He had likewise been charged with murder in the coroner's inquisition. Evans was found not guilty of murder but guilty of manslaughter. He was sentenced to be branded, presumably in the hand, and imprisoned for one month.

In reviewing the facts of the case as presented, two items are particularly relevant to the determination of the cause of death. First, it would appear that there was no significant alteration in the level of consciousness at the time of injury and, therefore, disruption of cerebral tissue and evolution of an

---

4. Blizard (1743-1835), son of an auctioneer, received only a scanty education before his surgical apprenticeship. After study at the London Hospital and St. Bartholomew's Hospital, he was made a surgeon at the former and later helped to found its medical school. There he lectured on physiology anatomy, and surgery. Blizard went on to become a Fellow of the Royal Society and Master (1814) and President (1822) of the Royal College of Surgeons of England. Zachary Cope, *The Royal College of Surgeons of England; a History* (London: Anthony Bland, 1959) 319, 339; Stephen Leslie and Sidney Lee, eds., *Dictionary of National Biography* (New York: Macmillan, 1908) vol 2:685.

5. *Glyster* var. of *clyster* (Gr. Klyster), an enema.

6. A blister was produced on the skin by application of an irritant. "Blisters are used as counter-irritants. By exciting a disease artifically on the surface, we can often remove another which may be at the time exciting internally." Robley Dunglison, *A Dictionary of Medical Science* (Philadelphia: H.C. Lea, 1968) 138.

7. The trepan is an obsolete form of the trephine.

8. *The Whole Proceedings* (note 1, above).

intracerebral hematoma would be unlikely. Second, there was a period of about two days between the time of injury and the time the patient first sought help. This is too long an interval for development of a typical epidural hematoma secondary to laceration of a branch of the middle meningeal artery, although one can see this prolonged course in the much less common venous epidural hematoma. The statement is made that "some extravasated blood lay on the dura mater" but one does not get the impression that any significant hematoma was present.

A subacute subdural hematoma would be unlikely in the absence of some evidence of loss of consciousness at the time of injury, although the time course would be consistent with this diagnosis. If the patient, however, had an asymptomatic chronic subdural lesion, minor trauma could have produced slight bleeding and decompensated an already marginal situation. No mention is made of the characteristic blue color of the dura which is seen in this condition and which should have been noted at the time of trepanation.

The frontal location of the fracture with possible involvement of the frontal sinus, the evolution of symptoms over a two or three-day period, and the lack of focal neurological signs even late in the course suggest that the patient may have succumbed to a fulminating pneumococcal, streptococcal or meningococcal meningitis secondary to a cerebrospinal fluid fistula. The notation that the dura "did not appear of its right shining Colour" may indicate evolving pachymeningitis. No mention is made of the fever or nuchal rigidity which one would expect in this circumstance.

In summary, it appears that the fracture was indeed the initiating factor in the patient's demise. The two most likely diagnoses are subacute chronic subdural hematomas, which would have responded to drainage, and meningitis secondary to rhinorrhea, which was untreatable in that pre-antibiotic era.

Department of Surgery
Yale University School of Medicine
New Haven, Connecticut 06510

Dwarfism and Cervical Rib in an Anglo-Saxon from Jarrow Monastery

CALVIN WELLS*

THE Anglo-Saxon burial ground of Jarrow Monastery, consecrated AD 685, has yielded about two hundred and sixty skeletons. One of these, Inhumation JA 67 NG 29, is of especial interest. It is that of a woman whose age, as determined from her pubes and skull, was twenty-four to twenty-eight years. In spite of this she had extensive osteophytosis of her vertebrae, as well as other abnormalities. The osteophytosis, which consists of lipping of the margins of the bodies of these bones, affects all the vertebrae to some extent. It is slight on some of the cervical and upper thoracic segments but well marked in much of the lower thoracic and lumbar regions. There is early collapse of the bodies of T7 and T9, and all the lumbar vertebrae have some cavitation or hollowing of the superior surfaces of their bodies. This saucer-like scooping of the bone does not resemble the common form of Schmorl's nodes. The C7 has no foramina transversaria. It has, however, a costal facet on its body and on its right transverse process. (The left side is damaged and indeterminable.) A right cervical rib articulates with these facets and its anterior end articulates with the medial border of a normal first thoracic rib (Figure 1). This supernumerary rib has a chord length of 66.5 mm and a maximum breadth of 15.6 mm. The rest of the ribs in this skeleton are much damaged but at least four middle ribs, two left and two right, are of unusual shape: the external surface of the body of the rib is concave from above down.

In addition to these vertebral and costal abnormalities both antra of Highmore (the maxillary sinuses) have extensive irregularity of their cavities, the left being worse than the right. This is doubtless the result of long-standing infection, i.e., chronic sinusitis; the antra probably were full of pus. Toxic absorption from this could perhaps have reduced the woman's resistance to other infections and might, itself, have been the source of a more generalized condition such as chronic infective bronchitis or perhaps even bronchopneumonia.

---

*Deceased

My thanks are due to Professor Rosemary Cramp for permission to publish this case, and to Miss Mary Kippen for her photographs of the bones.

Figure 1. Cervical rib articulating with normal first thoracic rib.

Especially interesting is the fact that the woman was extremely small. Stature reconstruction indicates that she was only about 1320 mm (4ft 4in) tall. Figure 2 shows her left radius and tibia paired with female bones of average size from the same burial ground. Dwarfism of this degree might possible be due to chronic illness, with malnutrition from anorexia throughout her childhood. In that case she would probably have been physically feeble as well as constitutionally weak. But, in fact, the muscle markings on her bones (e.g. the deltoid tuberosity, linea aspera and the ridge for the pronator quadratus) are well developed and show that she must have been fairly strong until she approached her terminal illness.

This might be nothing more than a case of "primordial" dwarfism or pygmyism, i.e., a "normal" dwarf — an extremely small person, usually the child of very small parents. Apart from the primordial variety, the most usual dwarf is of the hypopituitary type, which is due to various lesions that interfere with the normal functioning of the pituitary gland. But both these kinds of dwarf are usually of normal proportions, whereas this woman was not. Because of postinhumation damage an accurate assessment of all her skeletal proportions is impossible but it seems certain that her distal limb segments were relatively short compared with the proximal ones. Her brachial index (100xradius/humerus) was probably about 63.0, whilst her crural indices (100xtibia/femur) are precisely calculable as 75.2 (left) and 77.1 (right). These are extremely low values, the

Figure 2. Dwarf radius and tibia from the same skeleton compared with two average female bones from the same burial ground.

normal white female average being around 73.0 for the brachial index and 83.5 for the crural. But abnormality of these indices is characteristic of certain diseases. Chondro-ectodermal dysplasia (or Ellis-van Creveld syndrome) is associated with dwarfism, cardiac disorders, polydactyly, hypoplastic nails and teeth, whilst its limb shortening, unlike achondroplasia, affects the distal segments more than the proximal. A condition such as this needs to be considered here. The spinal changes in this woman might suggest the possibility of Brailsford-Morquio syndrome but in that disease vertebral deformities are usually much more extensive than here, the trunk being shortened grossly in comparison with the limbs; it need not be considered seriously in the present instance. Turner's syndrome is perhaps a possibility. This is a form of dwarfism associated with lack of mammary development, deficient axillary and pubic hair, congenital webbed neck, cubitus valgus, and other features. But on balance this, too, is not strongly probable and the most likely diagnosis is either primordial dwarfism or a syndrome of the Ellis-van Creveld type.

Apart from the problem posed by the diminutive stature there is a further uncertainty arising from the cervical rib. Did it cause any neural or vascular effects which partly contributed to the smallness of her right upper limb, i.e., was it responsible for any aplasia or atrophy of the arm? Sequelae of this kind are common with this anomaly. In a well developed case such as this, with a large C7 rib extending far forward in the posterior triangle of the neck and articulating with the T1 rib close to its sternal end, the anatomical relations of the supernumerary bone are similar to those of a normal first rib. The lower part of the brachial plexus, and the subclavian artery and vein, cross over it and may undergo compression as they do so. This is especially likely to involve the eighth cervical and first thoracic nerve roots, causing paresis of the muscles they supply, trophic changes in the limb, and other neural lesions. When the blood vessels are compressed, thrombosis, leading to gangrene of the fingers, may occur. In less severe cases slight to moderate underdevelopment or involution of the limb bones may be all that is detectable especially when, as often happens, the onset of symptoms is delayed until middle age.

In the skeleton from Jarrow Monastery the only bones of the upper limb that are bilaterally undamaged and fully measurable are the metacarpals. Table 1 shows the maximum length of each of these bones. In each case the metacarpals of the left hand are a little longer than those of the right. The difference is numerically small but the bones are very small and the overall total shows that the left metacarpals are 2.5 per cent longer than the right.

Additional scraps of evidence can be found in the long bones of these limbs. The head of the right humerus is about 2 mm less in diameter than that of the left side; the left deltoid tuberosity is marginally stouter than the right; the circumference in the proximal third of the left ulna is 1.5 mm greater than that of its counterpart. These are small differences and it would be wrong to expect them

Table 1. Metacarpal lengths (mm)

Metacarpal	Left	Right	Difference
I	35.3	34.1	1.2
II	53.1	52.9	0.2
III	51.4	49.9	1.5
IV	44.8	43.1	1.7
V	42.9	41.8	1.1
Total	227.5	221.8	5.7

to support a dogmatic conclusion which they are too slender to bear. But the overall state of the skeleton suggests that these facts may be meaningful and, if so, a reasonable hypothesis is that the cervical rib led to neural or vascular damage which caused slight underdevelopment or atrophy of the right upper limb as compared with the left. When muscular weakness or osseous aplasia results from a cervical rib it is usually the hand which is involved, but somtimes the upper arm is the part most affected.

Finnegan[1] has described a not very convincing case of a cervical rib causing disuse atrophy of a humerus. This was in a fifty-year old man from the Ken Caryl Range, Colorado, dated to about 490 BC. A right cervical rib, only 21.4 mm long, was present but had caused no detectable changes. An even smaller left cervical rib, 17.8 mm long, was present and the left humerus was of somewhat slighter build, though no shorter, than the right. In Finnegan's skeleton it is possible, but far from certain, that there was a causal relationship between the left supernumerary rib and the morphologically slighter humerus.

In the skeleton from Jarrow Monastery described here a causal relation between the large cervical rib and the morphologically and metrically smaller bones of the right upper limb, as compared with the left, is a much greater probability. But, even so, it must be conceded that a modicum of uncertainty remains. It is very unfortunate that this interesting skeleton is not better preserved so that a more precise diagnosis could be achieved.

SUMMARY

The skeleton of an Anglo-Saxon woman from Jarrow Monastery is described. The lesions included maxillary sinusitis, vertebral lesions, dwarfism, and cervical rib.

1. Michael Finnegan, "Cervical Ribs Related to Disuse Atrophy in an Archaic Skelton (490 BC): A Preliminary Report," *Paleopathol. Assoc. Newsl.* (Detroit), No. 15 (1976): 8-10

ESSAY - REVIEW

HARLAN LANE. *The Wild Boy of Aveyron*. Cambridge, Massachusetts.: Harvard University Press, 1976. 351 pp. $15.00.

Reviewed by DORA B. WEINER

Two bold statements illuminate the eighteenth-century way of thinking about Man, both of them elaborated by Englishmen. Sir Isaac Newton formulated the inverse square law in his *Mathematical Principles of Natural Philosophy* of 1687 and proclaimed that all matter on earth as in heaven obeys the same rules. This discovery transformed the mystical heavens into a sky that man may explore and gave special confidence and optimism to eighteenth century social reformers: if human intelligence could discover a universal natural law that regulated matter, equally valid rules might be discovered for society and for the better management of man. Alexander Pope would write:

"Nature and Nature's law lay hid in night.
God said 'Let Newton be!' and all was light."

To implement this quest for "natural laws" that might regulate society and man, Newton's contemporary, the physician John Locke, postulated an equally precedent-shattering proposition: in his *Essay Concerning the Human Understanding* of 1690, he contended that the human mind is blank at birth and that all knowledge derives from experience. By implication this theory obviated the need for an intermediary between man and God and thus struck a blow at organized religion, particularly the Catholic Church. It meant that innate ideas of good and evil did not exist and that the man-made social environment might then, through education, lead man to a happier, fuller and freer life.

Until the turn of the eighteenth century, the French had perceived the English cultural world as lying far away from their own and beyond that wide body of water, the English Channel. No one described this better or more amusingly than Voltaire in his *Philosophical Letters on the English,* of 1732. The universe of Descartes looked to him very different from that of Bacon, Newton, and Locke. But this was only true until perceptive travellers like Voltaire himself and Montesquieu or the abbé Prévost, having appreciated England, transformed their own country with the aid of ideas they brought home. Specifically, the sensationalism promoted by Locke found an echo in the abbé de Condillac's *Traité des sensations* of 1754 and this work, in turn, inspired two generations of French Ideologues. It guided their attempt to apply idealistic, rational principles to the reform of society. These Ideologues reached the height of their influence in France when Napoleon Bonaparte began his climb to imperial power. At that time Victor, the "wild boy," was caught in the woods of Aveyron.

The year 1800, when Victor was brought to Paris for study, proved an auspicious time for such an enterprise in France. A moment of international peace gave the nation a breathing spell before Napoleon would lead her into far-flung imperial adventures. In domestic politics, the turn of the century lay halfway betwen the conflagration of egalitarian Jacobin passions, now spent, and the repression of individual creativity by Napoleonic censorship. Even more important for the Wild Boy of Aveyron, a revolution had recently taken place in French education and medicine. Novel institutions and societies, and the best French educators, physicians, psychologists, and philosophers — most of them Ideologues — competed eagerly to observe, study, educate, and cure the Wild Boy.

Education, Carl Becker observed many years ago, would lead all believers to the *Heavenly City of the Eighteenth-Century Philosophers.* Education might reach men and women, young and old, rich and poor, ill and handicapped —perhaps even a mentally defective or severely retarded child. Owing to this faith, schools and societies with educational purposes had taken shape in profusion during the second half of the eighteenth century. While the Jesuits and Oratorians continued to educate the well-born, rich, and gifted, the Brothers of the Christian Schools sought to teach poor boys. The idealistic effort to create nation-wide lay primary education for boys failed during the Revolution for want of funds and teachers. But the attempt to set up a national network of secondary schools — "écoles centrales" — succeeded in part, and Victor's first encounter with the French educational world would emanate from one of these Central Schools.

In the late eighteenth century two pioneers had founded special schools in Paris: the abbé Charles Michel de l'Epée spent his fortune on an establishment for the deaf and, in 1784, he published *True Method to Educate the Deaf-Mute.* Almost at the same time and quite independently, Valentin Haüy founded a school for the blind, published *Essay on the Education of the Blind* (1786), and secured financial backing from the Philanthropic Society that had been founded in 1780. By the time Victor was discovered, both schools had become national institutions — they still exist today — so that Victor came to live at the National Institution for the Deaf-Mute, then headed by their famous teacher, the abbé Roch-Ambroise-Cucurron Sicard. (Modern movie-goers may remember the buildings and gardens of the Institution from François Truffaut's film about Victor, titled "The Wild Child.")

Even though Sicard pushed teaching methods for the deaf in the wrong direction by greatly exaggerating the role of logic and grammar in the elaboration of sign-language (and his own importance as teacher of the deaf), there is no gainsaying the fact that it was owing to his political astuteness that France's pioneering school was housed in magnificent spacious buildings, high on the Montagne Ste Geneviève. Sicard was equally astute in recognizing the abilities of Jean-Marc-Gaspard Itard (1775-1838), when this young surgeon was called from the nearby Val-de Grâce Hospital to attend to an accident. Sicard hired Itard on

the spot as physician for the deaf children: when Victor was brought to Paris, a knowledgeable doctor was therefore at hand. This was extraordinary in the contemporary context, for neither deafness, mutism nor blindness was then considered to be a medical problem. It never occurred to Valentin Haüy, for example, to seek medical advice in caring for his blind wards. While otology would soon be established by Itard, ophthalmology was advanced enough to permit successful operations for cataract. Children in general — in that age imbued with Rousseau's teachings — were just emerging as a special group of patients: the first children's hospital would open in Paris in 1802. Sicard's hiring of Itard thus remains a remarkable initiative.

French medical education had recently undergone a revolution that prepared the Parisian medical world to receive Victor in a way that even ten years earlier would have been impossible. A law of 1794 decreed that medical students would henceforth receive clinical training on the hospital wards, beginning with the first year of study. By the time Victor arrived in Paris, young physicians had therefore garnered some clinical experience. Even more important, the professors were acquiring the habit of observing patients on the hospital wards, daily, closely, with a view to gathering and recording specific information and teaching their students with the help of demonstrations, operations, and autopsies. Certain professors established advanced clinical teaching and research services and, in some cases, chose to reside at or near "their" hospital, thus creating the new medical specialty of full-time resident clinical professor. They usually served a private clientele to supplement their income as physician-in-chief; but their main activity and their reputation rested on clinical teaching. Philippe Pinel, physician-in-chief at the Salpêtrière Hospital when Victor arrived in Paris, had established a fine reputation as scholar, clinician, and owing to his "moral" treatment of mental patients, he would be asked for his opinion as to how "normal" a child Victor was. Pinel's opinion would weigh heavily in the scales that determined Victor's fate.

While Pinel was old enough to have been trained under the Old Regime, Jean-Marc-Gaspard Itard, Victor's champion, had been swept up by the military campaigns waged since 1792. He was lucky to have earned the protection of Dominique-Jean Larrey, the famous surgeon, who brought him to Paris in 1796 and to the Val-de-Grâce school of military medicine. Itard then learned academic medicine and, like so many of his generation, regularized his status as a physician owing to the law of 1803. Given this background and his age, it is understandable that Itard was more readily willing than Pinel to try a novel approach and to withhold judgment on a diagnosis.

The turn of the nineteenth century can thus indeed be seen as a turning point in every context that affected Victor's fate: France stood ready to study and to help this young "noble savage," captured in her own woods. This feral child of about twelve was caught like a wild animal in the forests of Aveyron in Southern France

in July 1798. Twice he escaped, before wandering into the workshop of the dyer Vidal, tired, cold and hungry, on January 8, 1800. Taken to the abbé Sicard's Institution in Paris in July of that year, he was entrusted to Dr. Itard, who spent five years trying to educate the boy he grew to love and whom he named Victor. But initial success ended in stalemate. Frustrated, Itard abandoned Victor, who lived for another two decades and died in 1828, at the home of his devoted nurse, Madame Guérin.

It is not to retell Victor's story that Professor Harlan Lane, Chairman of the Psychology Department at Northeastern University, undertook to write this well-documented book. Rather, he offers us the intellectual biography of three new methods: first, a method to educate children who are hard of hearing; then, a method devised by Itard's student, Edouard Séguin (1812-1880), to train child idiots; third, a method for the education of the normal pre-school child, devised by Maria Montessori (1870-1952). "...there is a basis of experiment which goes back to the French Revolution," she is quoted here as saying (p. 281), "and which represents the earnest work of the lives of Itard and Séguin."

Nor is this all: we also follow a teacher of the deaf, Thomas Hopkins Gallaudet (1787-1851) from Hartford, Connecticut, to Europe in quest of expertise. Rebuffed in Scotland and England, but well received in Paris, Gallaudet eventually returned with a Frenchman, Laurent Clerc (178?-1869), a star on the faculty of the National Institution for the Deaf-Mute in Paris. The founding of the "American Asylum at Hartford for the Education and Instruction of the Deaf and Dumb" is the wonderful and often repeated story of native American humaneness and generosity: $17,000 raised within a year; a 23,000-acre land-grant from the United States Congress; a student body that grew from seven to over two hundred in the forty years of Clerc's American career. Even more important, from the viewpoint of this book, appears the pluralistic methodology that was possible in America, the freedom to experiment with speech and sign-language, while in Europe a doctrinaire battle continued. Lane titles chapter IX "The Great Sign Controversy"; at the International Congress in Paris in 1900, the sections for sign-language and for speech refused to communicate with each other (pp. 253-54). The oral method had temporarily won the day. Lane deplores this development, arguing that the deaf have a language of their own, sign-language, that should be respected and interpreted for the "oral" majority, like any other foreign language.

Less controversial, it would seem, was the work of Edouard Séguin, who emigrated to the United States when Napoleon III assumed imperial power and died in New York City in 1880. In the Rue Pigalle, at his private school for the training of idiots, Séguin had received the visit of George Sumner. Sent to Paris in the mid-'40s to study Séguin's method, Sumner was to assist Samuel Howe in establishing a state school for idiots in Massachusetts. When James Richards was hired as its principal, he too was sent to Paris to study with Séguin. The

Revolution of 1848 soon obviated this transatlantic travel by Americans in search of expertise. Séguin taught successively at the Massachusetts State School for Idiotic Children, the Institution for Feeble-minded Youth in Barre, Mass., the Pennsylvania Training School, and Wilbur's experimental training school at Syracuse, New York. Having completed his M.D. in New York City, he took up practice, helped found the American Association on Mental Deficiency, organized a program and trained teachers in the Idiot House of Randall's Island and founded the Séguin Physiological School for Feeble-minded Children in New York City. Lane thus leads the willing reader far away from Paris and abroad to several lands, convinced that Victor so effectively challenged the intellectual community in 1800 that creative action resulted for over a century to come.

However far afield he may stray, Lane never loses sight of his main topic, namely Victor's education. The boy was examined twice in great detail before Itard became his physician and teacher, and Lane here offers both reports in English for the first time. The abbé Pierre-Joseph Bonnaterre, a highly educated "naturalist" (as scientists with a wide range of interests were called in that happy era before specialization set in), was teaching at the Central School of Rodez at the time of Victor's capture. Bonnaterre realized that this "wild child" should be studied immediately, before "civilized" living altered his behavior; he also knew that a provincial professor had little time before Paris would claim the boy. Bonnaterre's account is here given in a version edited by the Paris naturalist J. J. Virey; it fills fifteen pages. The paragraph headings may give an idea of the detailed questions asked by a contemporary observer: external appearance, gait, sensory process, speech deprivation, instinct, nourishment, suspicion of imbecility, character, regimen, comparison with other wild children. Bonnaterre recorded many significant details: Victor's whole body was covered with scars, most of them caused by burns, one of them on his throat, over 1 1/2 inches long, "which seems to be the scar of a wound made with a cutting instrument" (p. 34); he seemed always to have walked upright, not on all fours; the flexibility of his fingers in all directions was astonishing; when he ate, he let out a guttural sound and rocked his body; his sense of hearing was almost entirely passive and without any link whatsoever to language. His desires did not exceed his physical needs: the only blessings he knew were nourishment, rest, and independence.

The crucial puzzles were already clear to Bonnaterre: one concerned the boy's selective sense of hearing: "...he shows no perception of the noises made next to him; but if a cupboard that contains his favorite foods is opened, if walnuts, to which he is very partial, are cracked behind him, this noise strikes forthwith the organ of hearing and he will turn around to seize them." He was equally adept at shelling beans and preparing them for a meal. "...he distributed his materials as conveniently as possible. The pot was placed to the right and the beans to the left: he opened the pods one after the other with an inimitable suppleness of movement. He put the good beans in the pot and rejected those that were

mouldy... he took away the pot, added water... as soon as the pot began to boil he showed his impatience...." There was no question in Bonnaterre's mind that here was an intelligent human being; but what had happened to the divine gift, and why no connection between intelligence, hearing and speech?

Bonnaterre and his ward were summoned to Paris in July 1800 and a commission composed of the most distinguished scientific intellects of the time examined Victor: Philippe Pinel (1745-1826), the founder of psychiatry as a branch of medicine; Georges Cuvier (1769-1832), the famous zoologist and comparative anatomist; Baron de Gérando (1772-1842), the philanthropist who specialized in aid to the blind and the deaf; the abbé Sicard; and the naturalist L.F. Jauffret (1770-c. 1850) — all of them members of the Society of Observers of Man. Their report, written by Pinel, is here published for the first time in English.

Pinel had, at that time, reached the height of mature creativity. Widely acclaimed for reorganizing the huge custodial hospitals of Bicêtre and the Salpêtrière, he was then publishing, in rapid succession, his *Philosophic Nosography* (1798), *Treatise on Insanity* (1801) and *Clinical Medicine* (1802). His first objective, in these works, was correct diagnosis and classification. Therapy would then follow logically. His work was being so widely adopted that Ackerknecht calls this era the "period of Pinel." Little wonder, then, that Pinel wished first of all to diagnose Victor correctly. Equally unsurprising that he drew on his vast clinical experience, amassed in the thirty years since be obtained a medical degree in Toulouse in 1773. Lane is shocked and distressed to see Pinel compare Victor to mentally defective children on the wards of the Bicêtre and Salpêtrière. This seems natural, given Pinel's background. Lane is equally distressed to hear Pinel point out that animals also show curiosity, affection, and an interest in food. Pinel is particularly insistent on the "dissonance between vision and touch" that all observers noticed in Victor. He underlines the fact that Victor did not know how to cut bread or turn a key in a lock. That Victor was able to recognize, help prepare, and store food puts him within the range of many demented children on Paris hospital wards, argued Pinel. His sudden bursts of laughter, inexplicable from events, was another similarity with the hospitalized insane. Pinel, in short, saw here a child who never had, nor would ever acquire, more than minimal intelligence. Efforts at education were bound to fail.

Lane finds Pinel's diagnosis so full of flaws that "it is hard to understand why it has had so much weight" (p. 172). Itard, of course, disagreed with Pinel and spent five long years of arduous labor, teaching Victor the names of many objects, letters, words; rendering Victor sociable. Did Victor have human feelings? memory? imagination? intelligence? Much of the argument turned on the question of whether Victor, a normal child, was abandoned and lost his human capacities in the isolation and harsh surroundings where he lived, hounded like an animal; or whether heartless parents abandoned a mentally defective child to

fend for himself.

A likely possiblity not mentioned in the book is that a young mother, possibly mute and psychotic, ashamed of an illegitimate child or ostracized, may have taken young Victor into the woods and cared for him, at least for a while. How else to explain his acquaintance with fire, his crude knowledge of cooking, his pleasure at being stroked and tickled? Constans-St.-Esteve, the government commissioner who visited Victor immediately after capture, had written:

> I took him affectionately by the hand to lead him to my house; he resisted vigorously; but repeated caresses and particularly two kisses I gave him with a friendly smile decided him on the spot, and he trusted me a good deal from that time on....
> ...he rejoiced in seeing [potatoes]; he took them in his two hands and threw them into the fire. A moment later he reached his right hand into the coals and took out and ate the potatoes, while they were still burning hot.... When he became thirsty, he looked left and right; spotting a pitcher, without making the least sign, he took my hand in his and led me to it; then he struck the pitcher with his left hand, thus asking me for something to drink....
> ....[my observations] led me to conclude that this boy had lived in the woods since his early childhood, a stranger to social needs and practices. (p. 8)

Victor's behavior was surely well adapted to his situation: he knew edible food and how to steal it, he reacted to useful noises (like the cracking of walnuts), his fingers had developed unusual flexibility, he ran fast. He may not have spoken since speech is useless for a boy alone in the woods. After capture, he learned to sleep in a bed, to eat new foods, to wear clothing. Had he been mentally defective, he would never have survived. The thought that he must have loved a mother suggests itself, given his behavior toward St. Esteve, the abbé Bonnaterre, Itard, and particularly his nurse, Mme Guérin. Of course Victor bit and scratched when he was exhibited like a freak and teased by crude visitors.

It would seem that the "Observers of Man," Pinel, Sicard, Cuvier and the rest, approached this "wild" child with questions formulated within a rigid contemporary frame of mind. They inquired mainly whether he showed "intelligence"; whether he was capable of speech — the ability that, according to Descartes, divides man from animals. Itard tried desperately to prove that Victor could profit from education: if so, the eighteenth-century credo would be justified. In the end, they all lost heart and interest, so that no one seems to have bothered to suggest an autopsy when Victor died in 1828 — they may not even have been aware of his death.

Harlan Lane has now rendered the boy immortal for the English-speaking world. This well-documented volume with its flawless translations reveals a scholar to whom the magic world of French revolutionary archives is familiar and who appreciates "the priceless view of Paris rooftops accorded only to students and cleaning ladies" (p. 6). He understands the French bureaucratic mentality and a hierarchy in which a minister will give orders to a provincial official with the authority that a thousand years of divine-right monarchy imparts and a professor like Pinel will crush a young innovator like Itard. Lane's sympathies obviously lie with Dr. Itard, the author of *Treatise on Diseases of the Ear and Hearing* (1821)

and the founder of otology. Lane adds another illustration to a phenomenon with which historians are familiar: that a brilliant innovation devised in France — like aerostatics or the daguerreotype — should have received its most fruitful elaboration abroad. But if it is true that France was heavily indebted to England for the long-range inspiration of the eighteenth-century humanitarian credo, then there may be historic justice in the fact that Itard's work bore such plentiful fruit abroad.

Department of History
Manhattanville College
Purchase, New York 10577

Memoir of J. Montgomery Deaver 1901-1978

JONATHAN E. RHOADS, M.D.

J Montgomery Deaver, M.D., died November 12, 1978, after a long illness. He was one of the most respected members of the Philadelphia surgical community and a true friend to a great many of us. He enjoyed the confidence of many people of great influence simply on the basis of deserving it. When he gave his advice, it was straightforward and honest, and through this practice he was able to help many important causes. For instance, he was a vital factor in raising support for the Lankenau Hospital, for the University of Pennsylvania, for the College of Physicians of Philadelphia, and for many other worthy institutions.

Some who knew him less intimately will be interested in a brief resumé of his curriculum vitae and accomplishments. He was born in Wyncote, Pennsylvania, in 1901, the son of John B. Deaver, longtime chief of surgery at the Lankenau Hospital and John Rhea Barton Professor of Surgery at the University of Pennsylvania 1918-1922. His uncle, Harry Deaver, was also a widely known surgeon in the Philadelphia community. He graduated from the Hill School in 1920 and entered the Sheffield Scientific School at Yale University, graduating in 1924 but not before winning his Letter in football three years as an outstanding end on the Yale Varsity Team. He then entered the medical school of the University of Pennsylvania, graduating four years later in 1928 and taking a two-year rotating internship at the Lankenau Hospital in 1928-1930. He had his surgical training at Lankenau Hospital and was certified by the American Board of Surgery in 1937, the year the Board was founded.

My first acquaintance with him was as an instructor in surgery at the University of Pennsylvania. It is of interest that he joined the College of Physicians of Philadelphia early, being elected January 7, 1935, at the age of 33. He could hardly have had a stronger group of proposers than I.S. Ravdin, William Pepper, and Charles H. Frazier. Dr. Frazier was then the Barton Professor, having succeeded the elder Deaver in 1922; William Pepper was dean of the school of medicine of the University of Pennsylvania; and I.S. Ravdin, then still a young man, was director of the Harrison Department of Surgical Research and later chairman of the department of surgery at Pennsylvania.

During his college years Deaver went to Europe, and as a passenger on the liner Berengaria in 1924 he captained a team of Americans in a tug of war against a squad led by the Prince of Wales. According to the account on the front page of the Philadelphia Public Ledger, "the Prince's team and Deaver's struggled over the decks of the Berengaria for ten minutes before the British heir was pulled off his feet and sent sprawling on his back." Deaver's athletic prowess was again

recorded on the Ledger's front page when the Ivy League played the nation's best college football and "Monty" Deaver was named starting right end for Yale.

In 1932, he married Priscilla S. Sailer, daughter of Dr. Joseph Sailer, professor of medicine at the University of Pennsylvania. Dr. Deaver served on active duty in both World Wars, as a private in the U.S. Marine Corps in World War I and with the U.S. Navy for 48 months in World War II. He entered as a lieutenant commander on Feb. 23, 1942, and was separated from active service with the rank of captain on March 5, 1946. For 23 months he was overseas in the South Pacific Theater, serving as chief of surgery with the U.S. Fleet Mobile Hospital #108 in the British Solomon Islands for nine months in 1944, and with Fleet Mobile Hospital #105 to the end of 1945. Subsequently he was Unit Commanding Officer of the medical division 4-11 in the Volunteer Reserve Program at the U.S. Naval Base in Philadelphia. He was transferred to retired status at the age of 60 in 1961. He was awarded the Bronze Star in 1944 for his services with Mobile Hospital #108.

Dr. Deaver was a member of the Philadelphia County and the Pennsylvania State Medical Societies and the American Medical Association. He was a member of the Philadelphia Academy of Surgery and a Fellow of the American College of Surgeons and the Societé Internationale de Chirurgie, as well as a member of the American Surgical Association.

For a number of years he served on the Council of the Philadelphia Academy of Surgery, where he was a staunch upholder of the ethics of his branch of the profession; he was president of the Academy in 1962-1964. He served as a Trustee of the Hill School in Pottstown for 1948 to 1963.

Dr. Deaver went steadily up the academic ladder, serving as professor of clinical surgery in the Graduate School of Medicine of the University of Pennsylvania from 1952 to 1970, and as professor of clinical surgery at Jefferson Medical College from 1964 to 1967. In 1967 he became an honorary member of the faculty at Jefferson, and in 1970 an emeritus professor of clinical surgery in the Graduate School of Medicine, University of Pennsylvania. He was chief of surgical service "A" at the Lankenau Hospital from 1942 to 1964 and then succeeded in having the two services there unified in 1964, serving as chief of general surgery until 1967. He was the recipient of an honorary degree of Doctor of Science from Jefferson Medical College in 1973. In 1969 he became a member of the Board of Trustees of Lankenau Hospital, a very unusual occurrence for a staff member and one showing the great confidence reposed in him by the leadership of the hospital.

In 1968 a Lectureship was established in his honor which has continued as an annual affair. It was the writer's very great privilege to give the Deaver Lecture October 7, 1971.

In closing, I refer to certain contributions to the retrieval of patients with serious illness. In 1904 the late John B. Deaver reported 77 patients, all of whom

were children, who came to the Mary J. Drexel Home with acute appendicitis. Only two of these children died — a mortality of a little over 3% — and these were deemed too sick to operate upon. Among the many measures taken to save these children was frequent lavage and emptying of the stomach.

Forty-seven years later, in 1951, Dr. J. Montgomery Deaver gave the Annual Oration at the Philadelphia Academy of Surgery. His paper summarized the experience of 777 cases of acute appendicitis admitted to the Mary J. Drexel Home in the years 1930 to 1951. In reviewing this series, his emphasis was again on the management of the complications. He advocated careful control of electrolyte and water balance, the importance of always having an intravenous running during anesthesia, the use of suction drainage of the stomach and appropriate drainage of the abdominal cavity, and the use of sulfanilamide and penicillin. Mortality in his series was only a little over one percent.

In our later years, Monty Deaver and I belonged to the same dinner club and came to know each other more intimately. While he exemplifies many things, I would emphasize two: He demonstrated that the son of a widely acclaimed father can carve out a wonderful career of his own in the same field and in the same community, and he was always for me the personification of the word integrity and all that it means.

Memoir of M. Louise C. Gloeckner 1904-1978

KATHARINE R. STURGIS, M.D.

M Louise C. Gloeckner was born in Philadelphia in 1904, the daughter of William Riegel and Kate Bickings Carpenter. Her father practiced family medicine in Frenchtown, New Jersey, until his death in 1912. Dr. Gloeckner's aunt, Dr. Mary Bickings Thornton, was Professor of Anatomy at Woman's Medical College and exerted a strong influence on Louise.

The day after receiving her M.D. from Woman's Medical College in 1928, Louise married Frederick H. Gloeckner. They had three children — Kathryn Louise Shaifer, Frederick H. Jr., M.D., and David William. Last June, Louise and Fred celebrated their 50th wedding anniversary with their children, grandchildren, and legions of friends. It was a glorious, sunny day and everyone at the garden party was so happy! It gave testimony to the affection in which Louise and her husband were held.

Louise Gloeckner carried on a large family practice in Conshohocken from the time she completed her internship at Lancaster General Hospital. She was truly "the beloved physician" — gentle, compassionate, caring.

She first loomed on my horizon in the late 1940s. Louise was always in attendance at the Philadelphia County Medical Society's Postgraduate Institutes. She listened attentively, took notes, and asked incisive questions. She stood out from the audience through an aura of radiance which I recognized later as deriving from her glowing spirit.

Dr. Gloeckner was active in organized medicine. She was the first woman President of the Montgomery County Medical Society, and served as its delegate to the Pennsylvania Medical Society and, from 1959-1968, as delegate from the PMS to the American Medical Association. When she ran for the Vice Presidency of the AMA, two men were also scheduled to run. When they heard of Louise's candidacy, they withdrew and she was elected by acclamation. She was Vice President from 1969 to 1970 and is the only woman to have held an AMA office in the history of the organization.

Dr. Gloeckner gave generously of herself to the community. She served on the local Board of Health, was elected an Honorary Life Member of the Philadelphia Division of the American Cancer Society after years of service, and was a board member of the Homemaker's Home Health Association of Conshohocken. Among the numerous other board and committee memberships she held were President Dwight D. Eisenhower's Health Resources Advisory and National Civil Defense Committee, the Judicial Council of the Pennsylvania Medical Society, and the Board of Review of Blue Cross, Philadelphia. She was particularly

expert on protocol and chaired the PMS Committee on Constitution and Bylaws, as well as the Bylaws Committee of our own College of Physicians of Philadelphia.

Among Dr. Gloeckner's honors were Woman of the Year from the Conshohocken Business and Professional Women's Club, Distinguished Daughter of Pennsylvania, Outstanding Citizen's Award of the Conshohocken Chamber of Commerce, and the Annual Citation of the Commonwealth Committee of Woman's Medical College of Pennsylvania.

Louise was a convinced Quaker, a member of the Plymouth Friends Meeting of which she was Clerk of the Meeting for many years. She spoke frequently at Meeting about her concerns.

Louise and Fred had a beautiful country place in the hills outside Frenchtown. They, their family and friends refreshed their souls in the atmosphere of peace and simplicity which characterized their home.

Quietly, always with grace, Louise lived and worked among us despite worsening rheumatoid arthritis about which she never complained, a pacemaker, and numerous surgical procedures. She continued a full personal and professional life until five years before her death when, unable to carry the burden of practice, without self pity, she retired.

The Colonial Plymouth Friends' Meetinghouse was crowded to the doors at the memorial service for Louise after her death on November 4, 1978. Patients, friends, family, colleagues, and eminent Philadelphians spoke so feelingly that many were moved to tears. We could hardly bear to part with this warm, dedicated friend who, outspoken in defense of her convictions, was sweet without being saccharine, and strong and convincing in support of her principles without being hurtful, bitter, or rancorous.

Louise's sprightliness and concern for others continued to the end. As they took her for x-rays shortly before her death, she turned toward her husband and her daughter, Kathy, and said her last intelligible words: "Take care of yourselves!"

At the memorial services for Louise, one of her granddaughters — Phoebe — said that Louise had taught her to walk through the woods and love nature. We, Louise's grieving colleagues, can say that she taught us how to walk uprightly and love our fellowman.

Memoir of Harry P. Schenck
1894-1978

JAMES B. SNOW, Jr., M.D.

HARRY P. Schenck was born on January 6, 1894, in Philadelphia. He was educated at Haverford College and received his medical degree from the

University of Pennsylvania School of Medicine in 1923. He had graduate training in otolaryngology and pathology. He became a member of the Faculty of the University of Pennsylvania School of Medicine in 1925 and served as Professor and Chairman of the Department of Otolaryngology from 1939 to 1959.

Dr. Schenck earned national and international recognition for his important contributions to the management of patients with infectious and allergic diseases of the upper respiratory tract. In the course of his career he contributed over eighty articles to scientific and professional journals and numerous chapters to standard American textbooks, and edited "Otolaryngology" with George Morrison Coates.

Dr. Schenck was a Director of the American Board of Otolaryngology. He served on the Executive Committee of the Board of Governors of the American College of Surgeons from 1956 to 1964. He was Secretary of the American Laryngological Association from 1952 to 1957 and served as its President in 1957-58. He earned the Casselberry Award of the American Laryngological Association in 1929 and its Newcomb Award in 1958. He was a member of the American Otological Society, the American Laryngological Rhinological and Otological Society, and the Collegium Otorhino-Laryngologium Amicitiae Sacrum, as well as the Union League of Philadelphia.

In a labor of love from 1925 to 1937 Dr. Schenck served as the Curator of the Mutter Museum which houses the Politzer collection of temporal bones, the Hyrtl collection of comparative aural anatomy and the Jackson collection of bronchoesophagology among its treasures.

Dr. Schenck was a warm, generous, friendly man with devotion to his family, friends and country. In his retirement he nursed his invalid wife Edna Leinbach until her death in 1977. He took pride in his service to his country in World Wars I and II. In World War I he was a private in the 315th Infantry Regiment of the 79th Division. He fought and was wounded in France. In World War II he served as a Captain in the Medical Corps of the Navy on the hospital ship USS *Solace*. As fate would have it, Dr. Schenck died on Armistice Day, November 11, 1978.

This great friend and leader will be sorely missed. His friends have established the Harry P. Schenck Research Fund in the Department of Otorhinolaryngology and Human Communication of the University of Pennsylvania School of Medicine in his memory.

MEDICAL DOCUMENTATION SERVICE

THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

19 South 22nd Street, Philadelphia, Pa 19103 ● (215) 563-1238

Alberta D. Berton, Director

RETROSPECTIVE LITERATURE SERVICES

BIBLIOGRAPHIC VERIFICATION

Reformatting to meet American Standards Committee Z39 guidelines for periodical citations.

TELEPHONE REFERENCE SERVICE
TELECOPIER FACSIMILE DOCUMENT DELIVERY

SDI SERVICE Approximately 3400 titles in all languages.

Citation deposited on magnetic tape, machine readable material available (punch card or tape). Format and cost in accordance with client specifications.

ABSTRACTING

All languages

DATA EXTRACTION • LITERATURE ANALYSIS • EDITING • INDEXING
MEDICAL WRITING • GRAPHIC PRODUCTION SERVICES

TRANSLATION

Germanic Languages
Oriental Languages
Romance Languages
Russian
Scandinavian Languages
Slavic Languages

(Translations Supplied, Edited, Typed with one Xerox Copy)

XEROX SERVICE

Special attention is given to requests for fast service

Quo Vadis Collegium?

Report of the President: January 1, 1974 - June 30, 1978

JOHN P. HUBBARD

ON January 1, 1974, Katharine Sturgis yielded to the increasingly urgent insistence of her personal cardiologist and relinquished her duties as President of the College. As first woman to be president of our historic College, she brought to the office during her too short tenure of a year and a half a graciousness of leadership that all who worked with her will always remember. She summed up her accomplishment briefly and modestly as: "extending hospitality, housekeeping, decorating and construction, concerns for enhancing staff health and provision of a warm milieu." It is this last-mentioned feature that is such a dominant characteristic of our first woman president.

The premature termination of Katharine Sturgis' tenure of office created a problem for the vice president. Having not been closely associated with the activities of the College for many years, I had not had time enough to learn from Katharine Sturgis and from other members of Council as much as I needed to know about the functions, the goals and priorities of the College. However, specific provisions of the bylaws were followed and I was honored by the Council with appointment as president *protempore.*

At this point, let me interject that the dates at the heading of this report, January 1, 1974 - June 30, 1978, do not represent a misprint. Fellows familiar with the bylaws know that the term of office of the president is limited to three years. At election time in the spring of 1977, the College said to me in effect: "You have a lot of activities started. They are not yet established. Stay in there and keep going for another year."

It is not my intent to give anything like a complete or near-complete account of all that happened or did not happen during these four and a half years. Nor shall I attempt a chronological, year-by-year record. Rather I shall endeavor to describe the highlights of this formative and vigorous period giving particular attention to programs — some old, some new — that may be viewed collectively as an attempt to answer the question: Where are we and where are we going?

Quo Vadis Collegium? This was before us at the time of a reinstitution of the Annual Meeting of the College, held on September 11, 1974. Over three hundred Fellows and their guests enjoyed an excellent dinner in the candlelit Mitchell Hall, following which my election to the presidency was recognized by receiving from Katharine Sturgis the official gavel of the College. Other officers installed on the same occasion were Vice President John McClenahan, Secretary Edward McGehee, and Treasurer Donald Pillsbury. The program then continued as Mr.

Robert Michael, then Executive Director of the College, addressed the question: "Where are we?" He briefly reviewed the functions of the College including the Library and its historical collections, the Regional Medical Library Service, the Mütter Museum and the hard-pressed budget. He concluded with the poignant comment: "The College is faced with a critical decision, either to increase its income or enter a downward spiral of cost cutting."

It is the former of these options to which I was committed with some expansion of the wording: to strengthen the service programs of the College, to develop new programs, to draw together the Fellowship in the spirit of a collegium, and to find the money for the achievement of these goals.

To give some substance to this answer to where we are going, I noted at this same initial annual meeting two new programs to which active attention was already being given: first, the role of the College in the rapidly advancing field of continuing medical education, and second, a proposal that was really not new, having originated in 1969 during the presidency of Francis Wood, namely, that there should be created within the College an Institute for the History of Medicine. Let me now turn to the development and progress of these two major innovations of the College.

CONTINUING MEDICAL EDUCATION

A Practice Related Educational Program — PREP

By 1974 it was clearly evident that the continuing, life-long medical education of the physician was rapidly advancing on many fronts. State medical societies had begun requiring evidence of continuing medical education (CME) in order to maintain membership in the society. A sterner measure on the part of state licensing boards was underway to require CME for periodic renewal of an individual's license to practice his profession. Specialty societies were in a position to increase and expand their role in the continuing education at specialist levels. But what about the large body of primary care physicians not certified as specialists? To whom should they turn to meet their needs?

Aware of this need and recognizing that the College Library could play a role in meeting it, the College undertook to draw upon the several medical schools of Philadelphia to join in developing a continuing education program for the primary care physician. The National Board of Medical Examiners was invited to participate actively in the program, contributing its expertise in the preparation of the self-assessment testing and evaluation of results.

Funds would be needed to support this program. Fortunately, funds were promptly obtained through personal contact with the Bureau of Health Manpower of the Department of HEW, with a research grant of $275,000 for the first year. Then, with the finances in hand, a highly-qualified project director was sought and found. Frank Bowler, Ed.D., was persuaded to leave his work in

continuing education at the University of British Columbia in order to join the staff of the College. Steering committees and working committees were then appointed, drawing upon experts in their fields from across the country. The project was underway.

I shall not describe the program in detail here. It was reported at the A.M.A.'s Biennial Conference on Continuing Medical Education in October 1976; reprints are available on request (*JAMA* 277:1346-1349, 1977). Briefly summarized, the program consisted of four steps: (1) the physician completes a practice profile identifying the major components of his/her practice among a list of 11 components of primary medical care; (2) he/she selects the appropriate component (e.g., digestive disorders) for a self-assessment test; the self-assessment test is scored to identify the specific problem areas in which self-learning should be most profitable; (3) upon individual request to the College, appropriate, carefully selected references, photocopies and/or tapes are provided; (4) following the learning phase an equated self-assessment test covering the same component of practice indicates to the practicing physician the effectiveness of the self-education. He may then continue with another area of practice.

Because of the manner in which this program was related directly to the nature of the practice of the individual physician within the broad field of primary medical care, it gained the name of the Practice Related Educational Program and became known by its acronym, PREP.

Although PREP was widely announced through the traditional region of the College — Pennsylvania, Southern New Jersey and Delaware — the subscription to it by individual physicians has been disappointing. The College, having been accredited by the A.M.A. and the Pennsylvania Medical Society for Continuing Medical Education in January 1975, awards twenty points toward the Physician Recognition Award for one cycle of PREP. If the physician should choose to continue with additional cycles of PREP, the complete requirement for the established three year period could be satisfied by this program. But, while a number of those who have participated say "it's the best there is," they then add "it's too much work; we can get our PRA points more easily."

On the other hand, the program has drawn the attention of the A.M.A., owing to the unique feature of the inclusion of an evaluation of the effectiveness of the learning that has been accomplished. From a comparison between the scores on the initial self-assessment and the scores on the second self-assessment, the physician learns for himself whether he has accomplished his learning objectives in the selected area of primary care so that he can go on to a second or third major component of his practice. This aspect of the program separates it sharply from the traditional lecture or symposium where the individual can listen attentively or doze comfortably while getting his PRA credits.

During the last annual meeting over which I had the pleasure of presiding, on

June 14, 1978, I spoke of our PREP program as unfinished business. Negotiations were then underway with the A.M.A. whereby the PREP program would be offered to the A.M.A. for promotion and administration, thus giving it an influential basis. This was no small offer on the part of the College, taking into account untold hours in the development of pre-test and post-test material, the selection of the specifically referenced educational materials, to say nothing of a total of $700,000 that had been provided by the Department of HEW to cover the full cost of the development and launching of the program. In February 1979, we were assured that the A.M.A. Board of Trustees had accepted the offer of the College with the understanding that the College will be paid on a per capita basis for provision of the learning materials drawn from its library and that the A.M.A. will contract with the National Board of Medical Examiners for mass processing of the pre-test and post-test. The College can therefore feel assured of the achievement of the basic objective of the endeavor: increased use of its greatest resource, its medical library, meeting the needs of the primary care physician.

PREP — CV

While the PREP program was in the process of development, Joseph Vander Veer, a Fellow of the College, well known cardiologist and President of the Kynett Foundation, expressed the interest of the Foundation in supporting an effort to develop a program for the continuing medical education of the primary care physician specifically dealing with the prevention, care and management of cardiovascular disease. The design of the PREP program appeared to be well suited to this objective of the Foundation. A proposal dated July 1, 1976, was submitted to the Foundation and approved with a budget of $66,423 to cover the initial development costs.

The committee, under the chairmanship of another well known cardiologist and Fellow of the College, Joseph Wagner, agreed to start with two modules of what has become known as the PREP-CV, one module dealing with coronary heart disease, the other dealing with cardiac arrhythmias. Two subcommittees were then appointed, each to develop the pre-test, the specially referenced learning materials, and the post-test. Thus the development of the PREP-CV has followed the pattern of the parent PREP with the exception of the practice profile, which was considered unnecessary since the field of practice was already predetermined.

At present writing the development phase has been completed and the program is being readied for individual subscriptions.

CME on a Cooperative Multi-School Basis

Yet a third aspect of the College's activities in the field of continuing medical education began in 1975 with the scheduling of annual two- to three-week courses under the leadership of Albert Finestone, who was designated as the College's Director of Continuing Education Programs. Here, the College is serving the

function for which it is uniquely suited in bringing together the cooperative participation of the several medical schools of Philadelphia. The topic selected was emergency medical care. Each year a three-week course has drawn attendance from an increasingly wider area, the last course having representation from 21 states.

AN INSTITUTE FOR THE HISTORY OF MEDICINE

At the same meeting of the College referred to above, in September 1974, an announcement was made of a second major, forward-looking effort in response to the question of where the College was going.

One of the richest treasures of the Library is its historical collection: 60,000 bound volumes published before 1900, of which nearly 10,000 were printed before 1801; 423 incunabula (works printed before 1501); pre-1800 theses, pamphlets, manuscripts, and pictorial materials in unnumbered thousands. This priceless historical collection is, however, virtually unknown to the scholarly world. Little wonder, therefore, that it was the basis for one of the primary recommendations contained in a report resulting from a study of the present and future of the Library, made in 1968 by an outstanding committee of experts appointed by Francis Wood, then president of the College. This committee, under the chairmanship of Dr. George Berry, who was then Dean of the Harvard Medical School and who was the one primarily responsible for the building of Harvard's Countway Library, urged the creation of an Institute for the History of Medicine. Funds were not available for this venture in the budget of the College, however, and the recommendation was allowed to linger in the files.

In April 1974, a committee under the chairmanship of Francis Wood was appointed to have a fresh look at this recommendation of the Berry report. This committee gathered together a panel of distinguished scholars with broad representation from across this country and Canada. After a full day of discussion together with Francis Wood's committee, a strong consensus was reached that the College should create and maintain an Institute for the History of Medicine that would have an academic focus which would not be historical in the sense of only examining the past, but rather would be conceived in a mode cognizant of the past as applied to the issues of current, continuing concerns in medicine. The emphasis would be less upon specific persons, events, or eras than upon conditions and issues common to medicine, ethics, finance, governmental responsibility, professional organization, and the humanities in medicine.

The concept having been redefined and re-emphasized, the next task was to obtain the necessary dollars. As in the case of developing a program for continuing medical education, outside support was necessary.

At this same time, early 1975, as described below, the College's contract with the National Library of Medicine (NLM) for support of its Regional Medical Library Service came to an end and a new contract was called for. We were aware

of the NLM's interest and leadership in the history of medicine; it seemed reasonable, therefore, to include in the proposal for a new contract, an allocation for start-up money to allow the College to initiate its planning for the proposed institute. An amount of $50,000 a year for the three years of the contract was requested. This amount was approved, except that the period of support was limited to two and one-half years on the realistic grounds that it would take some months to recruit staff and incur expenses.*

The search for a director of this new division (Institute) was then undertaken on a national, and, in fact, an international basis. The result of this search was the addition to our full-time staff of Ronald Kotrc, who had acquired a Ph.D. with a research specialty in the history of medicine, undertaken in libraries and museums in Italy, Great Britain, France, and Germany. He came to us from the University of California at Irvine with a broad background as Assistant Dean of Humanities and then Assistant Vice Chancellor.

The task of developing the Institute then began in earnest. Within months of his arrival, Dr. Kotrc had requested and received a grant from the Commonwealth Fund for the study and cataloguing of our historical manuscripts and archives, an accomplishment which, when completed, will bring new attention to the relatively unknown treasures that lie hidden in our collection.

The prime initial objective, however, was to obtain the funds needed to insure continuity and growth of the Institute. To this end, an ambitious goal of $1,000,000 was set as an endowment to provide for basic support upon which the program of the Institute could be built. This goal was met. A generous donor promised a gift of $500,000 with three conditions: that he remain anonymous, that the College match his gift, and that the institute be named the Francis C. Wood Institute for the History of Medicine.

The anonymous gift was matched as noted below in the College's fund-raising campaign. The Institute was thus launched and assured of continuity. Currently it is engaged in charting its course, which has every promise of opening up hitherto unforeseen horizons for the College.

THE MIDEASTERN REGIONAL MEDICAL LIBRARY SERVICE (MERMLS)

When I assumed responsibility for the presidency of the College, the Regional Program, serving the medical library needs of Pennsylvania, Southern New Jersey, and Delaware as an arm of the National Library of Medicine, had been functioning effectively for six years. It covered the library needs of 500 hospitals throughout the region by means of a network of library resources supplementing

*The NLM's allocation was designated for a Division for the History of Medicine to avoid a precedent-setting contribution to an Institute for the History of Medicine; but it was recognized that the ultimate goal of the College was still an "Institute."

those of the College library; it had responsibility for training hospital librarians to serve in the field; it was fully funded by the NLM and was responsible for about one-third of the annual budget of the College.

MERMLS would probably not be a subject for inclusion in a Report of the President if it had not been for the timing and sequence of events early in 1975, when our Librarian, Elliott Morse, brought me a letter notifying us that the contract with the National Library of Medicine would be terminated early the following year. This notice sounded ominous but it did not come as a complete surprise. We had had intimations of forthcoming changes as a result of informal conversations with our friends at the National Library of Medicine, Dr. Martin Cummings, an Honorary Fellow of the College, and his deputy, Dr. Harold Schoolman. We had been repeatedly assured that the services which the College was providing for its region were among the best in the nation-wide network of regional programs. But it seemed that the time had come to have a look at other services and start fresh with a new contract rather than merely renew the existing contract.

Along with the notice of termination of the contract, we were advised that we would be given an opportunity to design and submit a proposal for an expanded MERMLS. This opportunity soon appeared in the form of a Request for Proposal (RFP), which was also addressed to all other medical schools in the region and to the University City Science Center of Philadelphia. At a meeting of all recipients of the RFP, held at the College on June 17, 1975, the question was openly raised as to whether the College should be the continuing agent for the MERMLS or whether it might better be transferred to one of the universities or colleges in the region. There was unanimous agreement that the College should continue to be the focus of MERMLS, except that the University of Pittsburgh expressed some reservation on behalf of more direct service for western Pennsylvania.

The timing of this critical situation was awkward indeed. Robert Michael, who had been appointed as Executive Director of the College during the Presidency of Katharine Sturgis, resigned on November 1, 1974. An immediate search was instituted for his successor. Many qualified applicants were carefully considered. The choice fell to William F. Chaveas, our present Executive Director, who came to us from his position as Dean of Administration of Burlington County College in New Jersey. We considered ourselves most fortunate and have continued to recognize evermore convincingly the benefit to the College in having as chief administrative officer one who had rich experience in administration in an educational setting. But it was not until the following April that Bill Chaveas could assume his duties at the College, leaving a gap of five months when the duties of the executive director also became the duties of the president: a most effective but not altogether desirable way for a relatively new president to learn all about the College in a hurry! When Bill Chaveas arrived on April 7, 1975, his first all-absorbing task was to undertake the detailed proposal to the National

Library of Medicine for a new and expanded contract that was due within a matter of months. After the expected negotiations and delays in the drafting of a proposal to the government, it was submitted for a total of $1,800,000 which, as noted above, included provision for the start-up funds for the Division for the History of Medicine.

Upon approval of the contract by the NLM, the MERMLS continued without interruption as a major program of the College under the careful guidance of its capable director, June Fulton.

THE BICENTENNIAL PROGRAM

When I took office in 1974, the nation's bicentennial was rapidly approaching. The College had been requested by the City's Bicentennial Commission to be the center for a major, permanent exhibit on the history of American Medicine. The College was told that $2,000,000 would be allocated and that prompt steps should be taken toward the design and construction of a new building adjoining the College. Architects were engaged for preliminary planning, but when costs to the College began to become visible, the $2,000,000 which had been assumed as a commitment on the part of the City dwindled to $200,000. Then, in keeping with the pattern that was becoming all too familiar in the city's planning for the bicentennial, the $200,000 completely disappeared.

The College, with its own bicentennial little more ten years later, determined to do what it could on its own without the help of the city. Planning was started for a limited exhibit to portray "The History of American Medicine: The Philadelphia Story." Also, planning for a series of bicentennial lectures by distinguished scholars was already underway. To cover the costs of the exhibit, Wyeth Laboratories, the Provident Mutual Life Insurance Company, and the Penn Mutual Life Insurance Company came to our rescue while SmithKline Corporation most generously sponsored the lecture series.

The exhibit standing in the central foyer of the College consisted of ten specially designed cases, each depicting a separate chapter of the Philadelphia Story: Men and Institutions of Early Medical Philadelphia; Military Medicine, the War of Independence; Yellow Fever, Holocaust and Heroics; The Development of Public Health and the Conquest of Disease; Philadelphia Medical Institutions; Advances in Surgery with the Conquest of Pain; Military Medicine during the Civil War; and more recent innovations and contributions of more recent date attributable to leaders of American medicine in the Fellowship of the College.

The lecture series, planning for which had been underway for over a year in the hands of an outstanding committee chaired by John McClenahan, was without question *the major highlight* of the 1976 bicentennial year. Fortunately, the seating capacity of Mitchell Hall had been increased to 425 in anticipation of the popularity of these lectures. For each of the monthly lectures the hall was filled to

capacity, except for those scheduled for June and July, when we shifted to the Bellevue Stratford Hotel because of lack of air conditioning in Mitchell Hall and because it seemed inevitable that Alistair Cooke, scheduled for July 8 of the bicentennial week, would attract a number that even the expanded capacity of Mitchell Hall could not accommodate. As he talked about "Staying Alive in 1776" there was not an empty seat on either the floor or balcony of the Bellevue ballroom.

Others included in this galaxy of lecturers were the following: René J. Dubos, Ph.D., Professor Emeritus, the Rockefeller University: "Creative Adaptations for the Future"; Paul R. Ehrlich, Ph.D., Professor of Biology and Director of Graduate Study, Department of Biological Sciences, Stanford University: "The End of Affluence"; Robert Coles, M.D., Research Psychiatrist, Harvard University Health Services: "Moral Development of American Children"; Harry Harris, M.A., M.D., F.R.S., F.R.C.P., Galton Professor of Human Genetics, University College, London: "Genetics, Medicine and Man"; Philip H. Abelson, Ph.D., President, Carnegie Institution, and Editor, *Science:* "Government Intervention in American Medicine"; Jean Mayer, Ph.D., D.Sc., Professor of Nutrition and Master of Dudley House, Harvard University: "U. S. Nutrition Policies for Our Third Century"; Alistair Cooke, K.B.E., author, historian and television host: "Staying Alive in 1776"; Stuart C. Finch, M.D., Chief Scientist, Radiation Effects Research Foundation, Hiroshima: "A Thirty-Year Follow-up of Survivors of Hiroshima and Nagasaki"; Victor P. Bond, M.D., Ph.D., Associate Laboratory Director, Brookhaven National Laboratory, Cyril L. Comar, Ph.D., Director, Environmental Assessment Department, Electric Power Research Institute, and Wilson K. Talley, Ph.D., Assistant Administrator for Research and Development, U. S. Environmental Protection Agency: "Panel Discussion: Health Considerations in the Development of Energy Sources"; Charles E. Cornelius, D.V.M., Ph.D., Dean, College of Veterinary Medicine, University of Florida: "Animals as Vectors, Sentinels and Models of Human Disease"; and Kenneth L. Vaux, Dr. Theo., Professor of Ethics and Theology, Institute of Religion and Human Development, and Baylor College of Medicine, Texas Medical Center: "The Vision of Health and Well-being: Refinements in the National Destiny."

FINANCES AND FUND-RAISING

It was at the annual meeting of the College in September 1975 that Jonathan Rhoads submitted highly significant recommendations of the Long-Range Planning Committee, of which he was chairman and which, in a sense, was the official mouthpiece of the College's recurrent question: Quo Vadis Collegium? He noted that: "It is clear that the College is on the brink of a rather severe mounting deficit on the one hand while on the other hand it appears to be on the brink of an

extraordinary expansion of activities.... It is, therefore, our recommendation, endorsed by Council, that we look toward a drive and, instead of trying to cut back on expenditures in order to stay within our slender resources, move ahead and find the resources to carry out the programs which we are in such a strong position to carry out and which are, we believe, increasingly needed in the modern world, with tremendous changes that are taking place for physicians and for the public in health care."

On April 13, 1976, with the nation's bicentennial in mid-flight, the College met in Mitchell Hall with a packed house for the purpose of putting muscle, i.e., dollars, into its forward-looking plans, which were beginning to be viewed as moving toward its own third century. Again Jonathan Rhoads, as Chairman of our Long-Range Planning Committee, set forth the ambitious goals that had been agreed upon:

"We have to face the fact that the total program is beyond the means of our limited membership of approximately 1,700 physicians and medical scientists. To gain help from the broader community, we must first provide a convincing demonstration of our seriousness of purpose and of our conviction of the importance of these objectives. To this end it was our best judgment that the Fellowship of the College should be asked to raise at least $400,000....

"Furthermore, we agreed that the first $100,000 should be raised from the officers, the members of the Council, and the members of the College committees — in short, from those involved in the affairs of the College now. The response in cash and pledges has been most gratifying. One hundred percent of the members of the Council have made of gift or a pledge, or both, in advance of this meeting. I am glad to be able to tell you that the gifts and pledges that came from the Council and committee members have now reached $101,075, over 25 percent of our Fellowship goal.

"We believe it is appropriate that this smaller group of approximately 6 percent of our College should subscribe 25 percent of the Fellowship goal. Needless to say, this has placed a significant strain on a number of the members which has been accepted in the belief that the total Fellowship will want to give generously and to make both gifts and pledges in the near future. This in turn will put the College in the strongest possible stance to go to other individuals and to industry and foundations for the larger sums that will achieve the goal of the campaign, which is a total of $4,400,000, and which will be required to provide strong programs in postgraduate medical education, medical history, and the other areas which have been described to you."

I shall not endeavor to describe in detail the devoted, continuing and laborious effort on the part of so many who worked toward the achievement of the stated objective. Special recognition must, however, be given to the effective organization, leadership, and day-by-day persistence of George Blumstein. He, with a cohort of Fellows assisting him, achieved the unprecedented goal of

$400,000 given or pledged by the Fellows. With this tangible evidence of the Fellows' faith in the College and their understanding of its financial needs, we were in a strong position to approach friends, foundations, and corporations. If to the funds received or pledged from these sources, we add the amounts of the specifically identified federal funds obtained during the period January 1, 1974, to June 30, 1978, we arrive at an impressive total of $4,568,784. This total, made up as shown in the table at the end of this report, is convincing evidence of the esteem in which the College is held in the community and of confidence in its mission. To all those who brought this achievement to this successful conclusion, the College is deeply grateful.

NON SIBI SED TOTI

"Not for one but for all." This is the motto of the College and this is the spirit of the College as its members join together for College Night lectures and dinners, for functions of its several sections, for demonstration of the educational features of its Museum and for use of its Library in pursuit of research and advancement of medical science.

It would be impossible in this report of the president to give recognition and appropriate thanks to all those who, in fact, are the College and give such real meaning to its motto. I have not described the work of the Mutter Museum and its indefatigable Curator, Elizabeth Moyer. She and her staff worked long and hard to prepare this historic museum for the visitors who came during the bicentennial and since, singly and in bus-loads. Suffice it to say that there is no feature of the College that is visited as frequently as the collections of this Museum, which are known not only nationally but internationally.

In the listing of contributions made to the College is the figure $51,000 resulting from the activities of the Women's Committee of the College. This money was responsible for enhancing the decor of the Museum, for the lovely curtains of Mitchell Hall and for bringing the College's garden, which was a rather weedy affair, to the lovely herb garden that it now is. The funds of the Women's Committee also made possible the restoration of valuable portraits, and, more generally, met many unbudgeted needs of the College. But beyond the importance of the dollars was the enjoyment of the functions which went into the raising of the dollars: the notable parties attended by the descendants of the illustrious Fellows of earlier years whose portraits are hanging on the walls of the College; the spring trip to the gardens of Virginia; a visit to the Tutankhamen exhibit at the National Gallery in Washington; tickets for Phillies ball-games; and two most notable "Evenings with Aesculapius," when our Patron Saint, standing at the head of the stairs, appropriately crowned with a laurel wreath, welcomed Fellows and guests to precedent-shattering dinner dances accompanied by silent auctions in our prestigious Mitchell Hall.

FUNDS RAISED FOR ENDOWMENT AND PROGRAMS

January 1, 1974 - June 30, 1978

FELLOWS:		
Endowment for Library, Institute for History of Medicine, Sturgis Medical Arts Collection and Restoration Fund		$421,472
ANONYMOUS DONOR:		
Endowment for Institute for History of Medicine		500,000
FOUNDATIONS:		
Pew Freedom Trust - Building Restoration	$500,000	
George Widener Trust - Building Restoration	250,000	
Kynett Foundation - Cont. Med. Education	146,312	
Measey Foundation - Inst. Hist. Medicine	100,000	
Commonwealth Fund - Hist. Collect. Catalog	28,000	1,024,312
CORPORATIONS:		
SmithKline Corp. - Bicentennial Lectures	34,000	
SmithKline Corp. - Third Century Fund	60,000	
INA Corporation - Third Century Fund	4,000	
Penn Mutual Life - Third Century Fund	3,000	
Provident Mutual - Bicentennial Exhibit	12,500	
Merck and Company - Bicentennial Exhibit	10,000	
Wyeth Laboratories - Bicentennial Exhibit	7,500	131,000
WOMENS COMMITTEE - Specific College Needs		51,000
GOVERNMENT GRANTS AND CONTRACTS:		
Dept. Health, Educ. and Welfare - CME	641,000	
Natl. Library of Medicine - Reg. Med. Libr.	1,800,000	2,441,000
TOTAL		$4,568,784

Finally, in closing this report of the president, I would like to revert to the word *Collegium* with its dual meaning. We have seen how the College as an institution has progressed giving new impetus on old objectives. I have mentioned only a few of many individuals to whom credit is due for the progress that has been made. There are so many more. No mention has been made of Elliott Morse, our librarian, whom I view as the heart of the College, responsible for maintaining the circulation of its vital resource, the literature of medicine past and present. His devotion to the College is unequaled and the record is before us in the Annual Reports which include the facts, the figures and the dollar signs of the several divisions of the Library. Prominent in these reports is the productive work of the Medical Documentation Service where, under the able direction of Alberta Berton, its contracts with outside users bolster up many aspects of our financial needs.

I could continue to cite the names and the work of other members of the staff, the total number of which is approximately 85. They are the ones who make the College function, whether they are at their desks, working in the stacks, or in the fieldwork of the MERMLS program. But I shall leave further detail to the Annual Reports of the several divisions of the College and urge the Fellowship to give them their attention and interest.

Also published annually in these pages are the names of the officers, other members of the Council and the College's several committees. Having had the privilege of appointing the committee chairmen and with their advice the members of the committees, I have had the opportunity which I have so greatly appreciated, to work closely with this Collegium, this community of scholars, who, individually and collectively, are responsible for the achievement of the progress that it has been my pleasure to report to you.

829 Black Rock Road
Gladwyne, Pennsylvania 19035

The Assessment of Technology in Medical Care: Recent Developments

SEYMOUR PERRY

DURING the past three decades there have been great advances in American medical care. With this improvement has come a rapid increase in the role of science and technology in medicine. Every year increasing numbers of new diagnostic, preventive, and therapeutic technologies are transferred from research and development to practice.

While technological innovation and biomedical research have led to many of these important improvements, some serious questions about the application of technologies have been raised. The belief has emerged that a number of technologies have been widely accepted by practitioners without adequate information about potential benefits, risks, cost-effectiveness, and societal side effects. At the same time it has been alleged that some well-validated innovations have been slow to reach the practitioner. There also has been a troubling, continuous rise in the costs of health care, now at more than $160 billion per year — up from $10 billion per year in 1950. With new advances in technology have come soaring costs. For example, computerized tomographic (CT) scanners are priced as high as $700,000, with yearly operating costs exceeding $370,000, and a renal dialysis program that cost $500 million in 1977 is expected to approach $2 billion in 1982 and $6.3 billion in 1992.

In light of the growing problems related to the development of medical technologies, the Department of Health, Education, and Welfare (HEW) has acted to strengthen existing programs for the assessment of medical technology and has added new ones. The overall aim of all of these activities is to provide research workers and practitioners, as well as the public, with accurate, up-to-date information for guidance in the use of technologies, whether these be devices, drugs or procedures. The most recent additions to the Department's assessment program are the National Center for Health Care Technology (NCHCT) and the National Institutes of Health's program for the development of consensus.

The Center was established within the HEW Office of the Assistant Secretary for Health under legislation (Public Law 95-623) passed by Congress in 1978 just prior to adjournment. The main responsibility of the NCHCT is the comprehensive assessment of high priority technologies based on considerations of prevalence of use, cost to the nation, safety and efficacy, etc. The Center is not a regulatory agency. Its activities are aimed at providing assessments of health technologies to Federal and non-Federal entities that have an interest in the health care system.

The NCHCT coordinates the activities of HEW in the assessment of medical

technology and makes recommendations on appropriate use of new and existing technologies. The operational forum for these activities is an internal group in which all the agencies of the Public Health Service are represented. There is also a liaison member from the Health Care Financing Administration (HCFA). In addition, on matters of coverage by Medicare the Center makes recommendations to the HCFA concerning the appropriateness, cost-effectiveness, and medical validity of technologies. HCFA uses these data to develop its reimbursement policies for Medicare. Another function of the Center is to distribute information about technologies to various Federal agencies, third party payers, practitioners, and the public.

Under the legislation, an 18-member National Council on Health Care Technology was also created. The panel includes physicians, social scientists, hospital administrators, lawyers, ethicists, consumers, and representatives of industry. The Council advises on technology assessments, reviews grants and contracts in excess of $35,000, advises on the safety, efficacy, and cost-effectiveness of health care technologies, and develops and disseminates criteria concerning health care technologies through the National Library of Medicine.

In the consensus development program of the NIH, biomedical research scientists, practicing physicians, consumers, and others are brought together in an effort to reach general agreement on the efficacy and safety of a medical technology. Ethical issues and cost implications also may be discussed at consensus development conferences.

The consensus development program of the NIH adds to, and does not replace, traditional publication of research in the open literature. Basically, the program is a formal process that is a natural extension of the research community's role in readying research findings for application in the health care delivery system. Consensus development is a type of technology assessment that is designed to serve as an essential preliminary step before the transfer of a technology into the health care delivery system.

Some of the principal characteristics of the consensus development program are as follows:

It focuses mainly on clinically relevant research and on the readiness of certain important findings to be put to use in health care.

It involves research assessments that, nevertheless, may take into account not only efficacy and safety, but ethical, legal, and financial implications.

It involves a formal, public meeting at which opportunity is provided to discuss all pertinent viewpoints.

It includes preparation of a record of its hearings, including a summary of recommendations and conclusions, which is distributed to research workers, practitioners, and the public.

Full and broad participation by a wide range of experts and laymen is a critical part of the overall effort for development of consensus. If there are different

shades of opinion concerning a technology, it is important and valuable to practitioners and academicians, as well as to the public, to present the various sides of the problems. From the beginning, NIH felt that in consensus activities it should act only as a catalyst. Federal involvement in these meetings has been kept to a minimum in order to enhance credibility of the results of the conferences.

At the first conference for the development of consensus, held at NIH in September, 1977, a broadly representative panel of experts and laymen agreed on a series of conclusions and recommendations on screening for breast cancer, including mammography. The National Cancer Institute (NCI), which cosponsored the meeting with Office of the Director, NIH, later implemented the recommendations. As a result of the conference, the NCI program for the screening of breast cancer was continued, but some additional limits were placed on the selection of age groups that were to be screened routinely. In the first year of the new program for the development of consensus, 11 additional conferences were held. The subjects ranged from dental implants to the availability of insect sting kits to nonphysicians.

The arrangement of the conferences has been as varied as the subjects. On some occasions neutral panels of medical professionals and laymen have been convened to consider the pros and cons of a device or procedure. At other conferences members of task forces have prepared draft documents in advance and these papers have been the focus of discussion at the meetings. In compliance with the discussions these drafts were later revised. On one occasion proponents and opponents of a technology were brought together in the same room in an attempt to resolve differences. An expert who had no direct stake in the technology acted as a moderator to pull together the main points made by the opposing groups. Needless to say, this arrangement provoked lively debates.

In order to facilitate and coordinate the program for the development of consensus the Office for Medical Applications of Research (OMAR) was formally created at NIH in October, 1978. OMAR monitors the progress and effectiveness of the program and coordinates the conferences for the development of consensus. More specificially, OMAR:

Advises the Director of NIH on medical technologies and on the application of medical research;

Works with the NIH institutes to promote effective dissemination of this information to academic biomedical research workers, to persons engaged in health care, and to the public, and through the NCHCT, to other Federal agencies; and

Provides a link among technology assessment activities of the bureaus, institutes, and divisions of NIH with the Center.

To understand why it became necessary for HEW to intensify its efforts to improve the methods of assessing health technologies and disseminating research information, it is instructive to examine the present process whereby

new information flows from the research arena to the practice of medicine.

Medicine has evolved into a process where information is obtained in the laboratory, applied in animals, or carefully evaluated in man by means of clinical trials. Ultimately the new knowledge enters the health care delivery system. Clinical trials are critical in the transfer of this research information. If the trials are well designed, they can lead to the validation of a new and superior diagnostic technique, a drug, or a surgical procedure, or on the other hand they can show clearly that an established technology is not effective or safe. The results of clinical trials reach practitioners in many ways — through journals, textbooks, professional meetings, personal contacts, programs of continuing education, control and demonstration, and through salesmen and sales representatives ("detail men").

Most physicians do considerable reading, but the average physician faces an overwhelming task in his attempt to keep current. He is flooded with information. In one year, the National Library of Medicine may index more than 260,000 articles, many of them pertinent to health care. From July, 1971, to June, 1972, for example, there were 372 articles concerned with breast cancer. In the presence of this volume, it is impossible for the average physician to assess this new information in order to determine if a technology has been adequately validated for safety and efficacy. There is no way in which he can gauge the collective opinion of researchers and practitioners on whether that technology is better than what is already available.

Historically, adoption of a technology by practitioners has involved a number of factors — its complexity, effectiveness, expense, safety, economic return, and, finally, public pressure, especially that generated by the media. These traditional methods of arriving at consensus are slow and tedious and, in general, are supported by good reasons, but there has been no mechanism whereby technologies can be assessed formally.

There is a general impression that many technologies have not been used appropriately, in large part because consensus is fragmentary and ineffective and transfer of technology from academic research workers to practitioners has been defective. When important new clinical information has been identified, the customary methods used by research workers to "spread the word" have worked much better among some practitioners than others. Communication has been most effective with those working in medical schools or in the main research or therapeutic settings, or with medical specialists who have direct incentive to keep current with the latest data in their areas of interest. Those who have few contacts with medical schools or research centers and have little time to spare from busy practices, on the other hand, are frequently farther down the research information pipeline. And the problems with this flow of information related to health care have been aggravated by shortcomings in the flow of information in the other direction — from practitioners to research workers. To improve the

whole process of dissemination of information is the chief purpose of the NIH consensus development program.

Aside from the effort of the NIH to develop consensus, and apart from assessments sponsored by the NCHCT, various other components of HEW are, within their respective responsibilities, also engaged in evaluation. The National Center for Health Services Research (NCHSR) plays an integral role in Federal efforts to assess technology. Its activities in the sphere of assessment and transfer are related to hospital management data and billing systems and to the use of computers and communications technology for the delivery of services. In addition to its past duties, the NCHSR will participate actively in designing and implementing studies of cost/benefit and cost-effectiveness, and other evaluations of societal impact to be carried out by the NCHCT.

As a regulatory agency, the Food and Drug Administration (FDA), another component of HEW, has been assessing drug activities for years and, more recently, has assessed devices. Federal law now requires that the safety and effectiveness of drugs and devices be shown prior to marketing. Within the FDA, the Bureau of Radiological Health has as one of its major tasks the monitoring of radiation exposure, including medical radiation exposure, the assessment of public health risks, and the implementation of actions to reduce unnecessary exposure to radiation. Information on the safety and effectiveness of drugs, biological products, medical devices, and diagnostic products approved for use is conveyed to the NCHCT by the FDA.

In considering the activities of the Public Health Service agencies in the assessment of technology it is important to note the role of the Health Resources Administration (HRA) in disseminating information. HRA, through its responsibility for the various health planning agencies at the state and local levels, has principal responsibility in the distribution of information concerning technologies. National guidelines issued by HRA cover the appropriate supply, distribution, and organization of health resources. The health systems agencies, at the local level, are expected to review and approve the need for new institutional equipment and health services.

Further, the National Council for Health Planning and Development of HRA makes recommendations to the Secretary of HEW regarding the national guidelines and national health goals. The Council also is expected to evaluate the implications of new medical technology in the organizational delivery and distribution of health care services. As one of the agencies of the Public Health Service, HRA is represented on the operational group of the NCHCT and the chairman of the planning council will be an *ex officio* member of the national advisory group to the Center.

Another key element in the overall Federal health technology effort is the congressional Office of Technology Assessment (OTA). OTA, created in 1972, is

an advisory arm for the Congress, providing members with independent information about potential benefits and risks surrounding the use of a given technology. The health technology division of OTA has published a number of widely read reports on such controversial topics as computerized axial tomography (CAT) scanners. NCHCT, OMAR, and OTA will be working together to strengthen the Federal Government's overall efforts to assess technology in medicine.

The Administration, the Department, and the Congress have all identified a need to improve the processing of new technologies at the important meeting-point of health research and development and the health care delivery system. All are working to promote interest in the development of new technologies and to develop a firmer foundation for offering guidance to practitioners, to persons responsible for setting of standards and for regulation, to the health industry, the public, and others who need to have such guidance in the application of technological innovations.

With the creation of such programs for the assessment of technology as that in place at NIH, have come fears that the development of consensus could lead to "cookbook medicine." There are those in the medical profession who fear that any new mechanism for assessment of technology could be twisted into one that impedes technological innovation or rigidly prescribes the practice of medicine. However, the fact is that these activities are aimed at providing guidance to the practicing community.

In 1979 approximately 25 consensus-development conferences have been planned, compared to 12 held in the first year of the program. Dissemination of the outcomes of those conferences has been expanded to reach larger segments of the medical and lay populations. Carefully constructed assessments can be a strong, positive force for the practicing community and the public and can serve to initiate additional innovation and utilization. In this way, while the assessment of technology can contribute to the control of rising health care costs, it can also be a force to improve the delivery of health care in the United States.

National Center for Health Care Technology
Office of the Assistant Secretary
Department of Health, Education,and Welfare

Exposure to Lead in Ancient Populations

TONY WALDRON and CALVIN WELLS*

EXPOSURE to lead is an environmental or occupational hazard which is easily investigated by archaeologists, since lead is taken up and stored in the bones during life and held there in a relatively stable state. By far the greater part of the total body burden of lead (80 to 90% or more) is in the skeleton, hence the concentration of lead in skeletal tissues represents a summation of the amount absorbed during life and indirectly indicates the degree of exposure.

We have been using skeletons exhumed from a number of different archaeological sites in an attempt to study the degree to which earlier populations were exposed to lead. We present here some of our findings and our observations.

ANALYSIS

All the samples were analysed by atomic absorption spectrophotometry by means of a method which has been described in detail elsewhere; the results are expressed as micrograms of lead per gram (μg/g) of dry bone. The reliability of the method has been well established, both by frequent internal standardisation and by comparison of the results with those obtained from a physical method employing fast-particle bombardment.

RESULTS

There are great differences in the mean concentrations of lead in bones from the various sites (Table 1). The samples from the oldest remains (Bath and Danebury) have the lowest concentrations, although these levels are not much different from those found on the remote site in Iona. Bones from the Romano-British cemetery at Cirencester have high mean values, higher indeed than any which have been found in material from other Romano-British cemeteries.[1] Values as high as those from Cirencester are found in some of the medieval sites, the concentrations in the bones from Jarrow being extremely elevated.

Acknowledgements

Our thanks go to numerous archaeologists and museums for allowing us to use material in their care. We are especially indebted to Miss Barbara Green, F.S.A., B.Sc., and to Mr. Tony Gregory, M.A., for their interest and advice throughout our investigation. We thank Mr. J.M. Groves, B.Sc., for analytical assistance.

1. A. Mackie *et al.*, "Lead Concentrations in Bones from Roman York," *J. Archaeol. Sci.* 2 (1975):235-237; H.A. Waldron *et al.*, "The Lead Content of Some Romano-British Bones," *Archaeometry* 18 (1976):221-227.

*Deceased

The percentage distribution of the results from the four largest series shows some interesting features (Figures 1 and 2). The levels found at Bonhunt are much lower than the others, and have a narrow spread, with no values in excess of 250 μg/g; exposure to lead of those buried at this site was clearly unexceptional. At North Elham Park, exposure for the general mass of the population was not much greater than at Bonhunt, but a small percentage of the population seems to have had an unusual exposure which has resulted in concentrations much higher than average. The Cirencester folk apparently had a considerably greater exposure to lead than the inhabitants of either of the two previous sites, and there is some evidence of a bimodal distribution, as shown by the peak at the tail of the graph: the people represented here were unusually exposed even for Cirencester. It is at Jarrow that the most extreme example of heterogeneity occurs, almost a third of the total population apparently having lead concentrations in the bones grossly in excess of the remainder, whose exposure is otherwise similar to that of Cirencester. The males in the series account for the majority of the very high values, as may be seen from Figure 3. Whether these extremely high values truly represent a subset of the population who were subjected to levels of lead which were exceedingly high, even by Jarrow standards, or whether post-mortem contamination has occurred is a problem to which we cannot give an unqualified answer. This is a matter which we intend to study further, especially since similarly high levels of lead in bones from Runcorn Priory have been related to the high levels of lead in the soil (Atherton, personal communication).

Levels in different bones

When comparing the overall means in Table 1, allowance must be made for the fact that the samples do not contain the same ratio of bones of different types. Where possible, like should be compared with like, since lead is not distributed evenly throughout the skeleton. We examined this point by taking samples of rib, vertebra, and ulna from 43 of the Cirencester skeletons; the results of these analyses are shown in Table 2. The mean levels in the ribs and vertebrae are almost twice that found in the ulnae, and the spread of values is also much greater. Moreover, there is no significant correlation between the levels found in the ribs and the ulnae, or between those in the vertebrae and the ulnae; the correlation between costal and vertebral levels is significant, however (Table 3).

These observations demonstrate the importance of specifying the type of bone used in this kind of analysis, particularly if comparisons are to be made with other studies.

Levels in the same bone

In twenty-five instances, duplicate samples from the same type of bone were sent for analysis, without the prior knowledge of the analyst. There was no statistically significant difference between the results, and this was reassuring

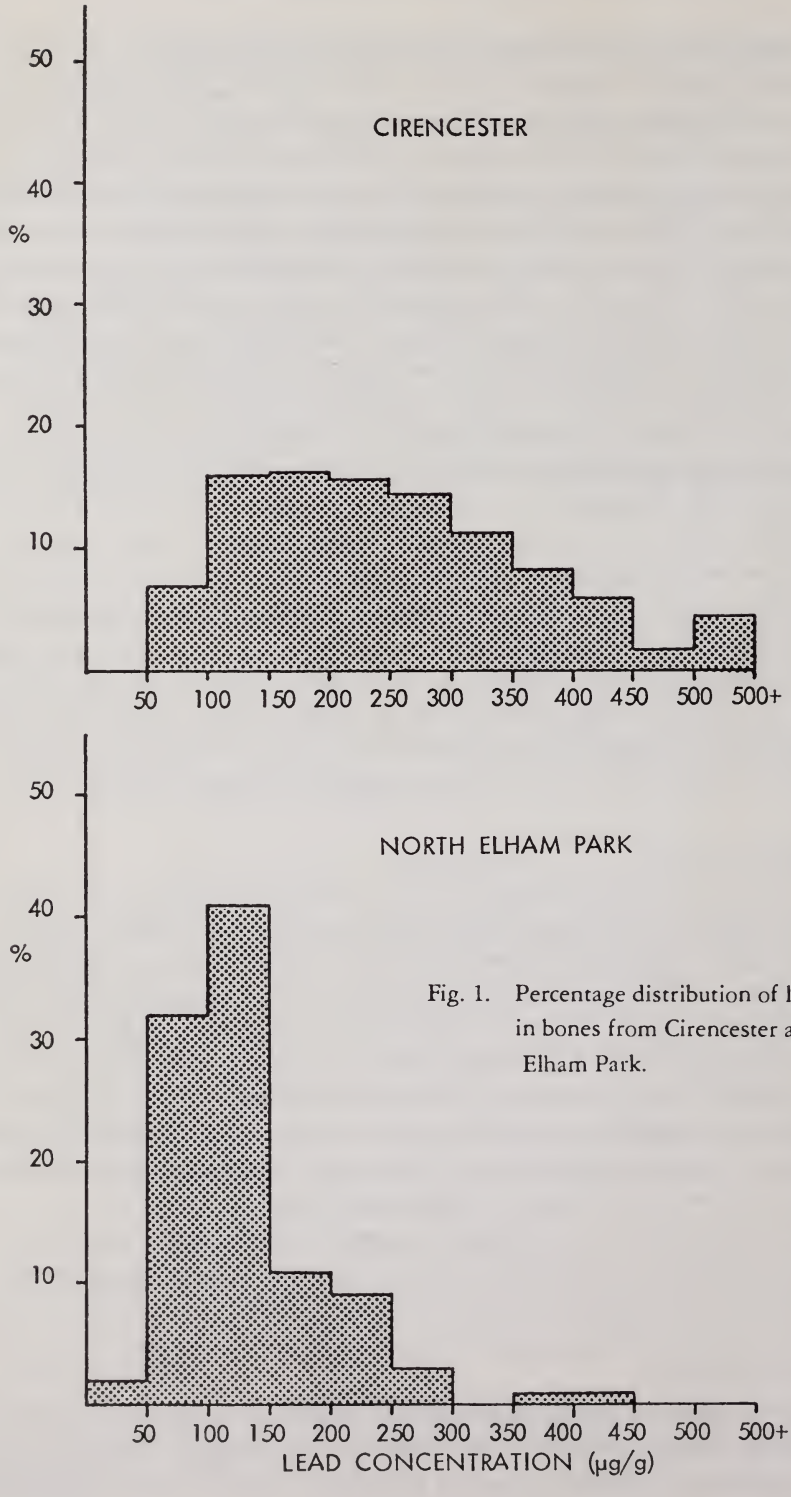


Fig. 1. Percentage distribution of lead levels in bones from Cirencester and North Elham Park.

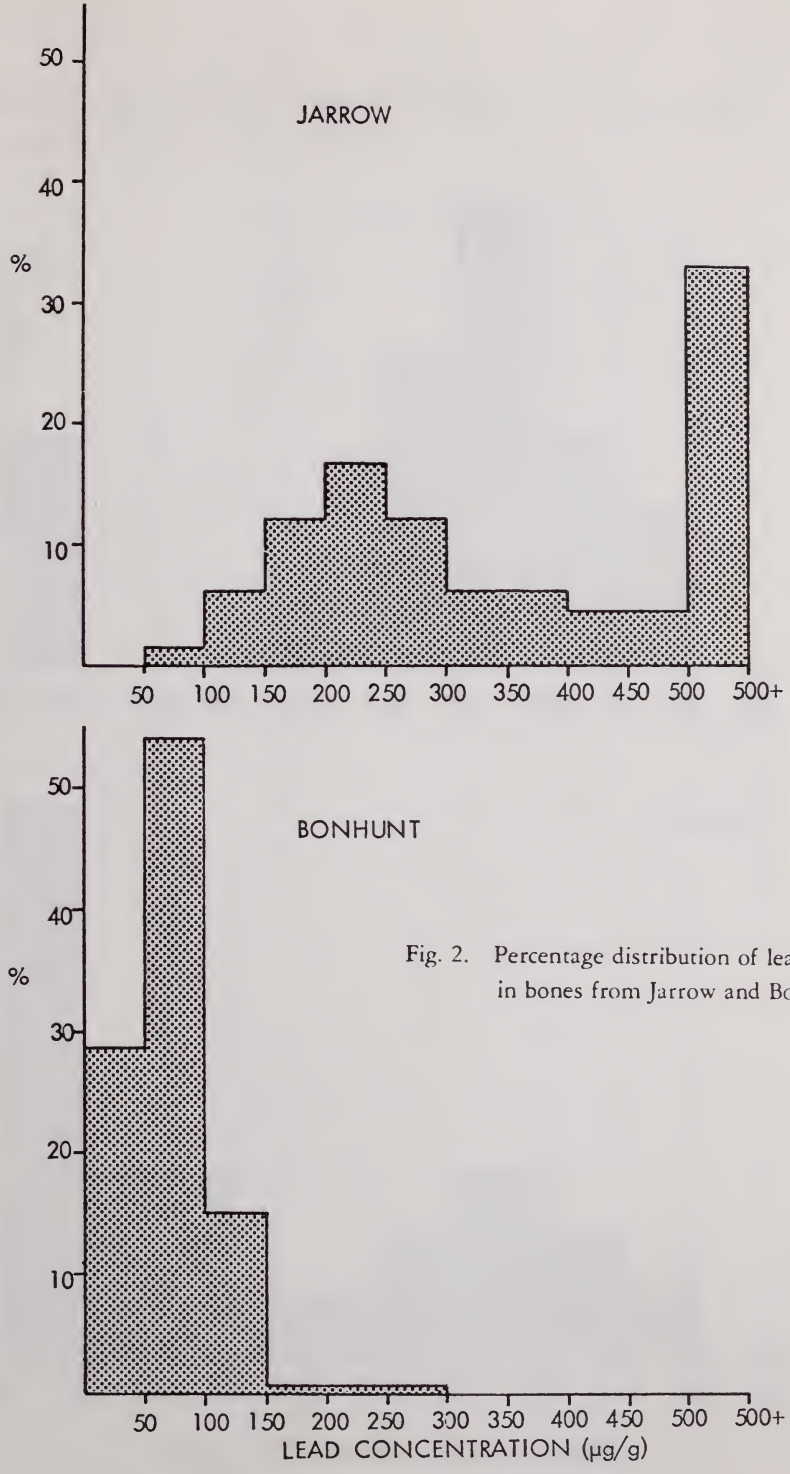


Fig. 2. Percentage distribution of lead levels in bones from Jarrow and Bonhunt.

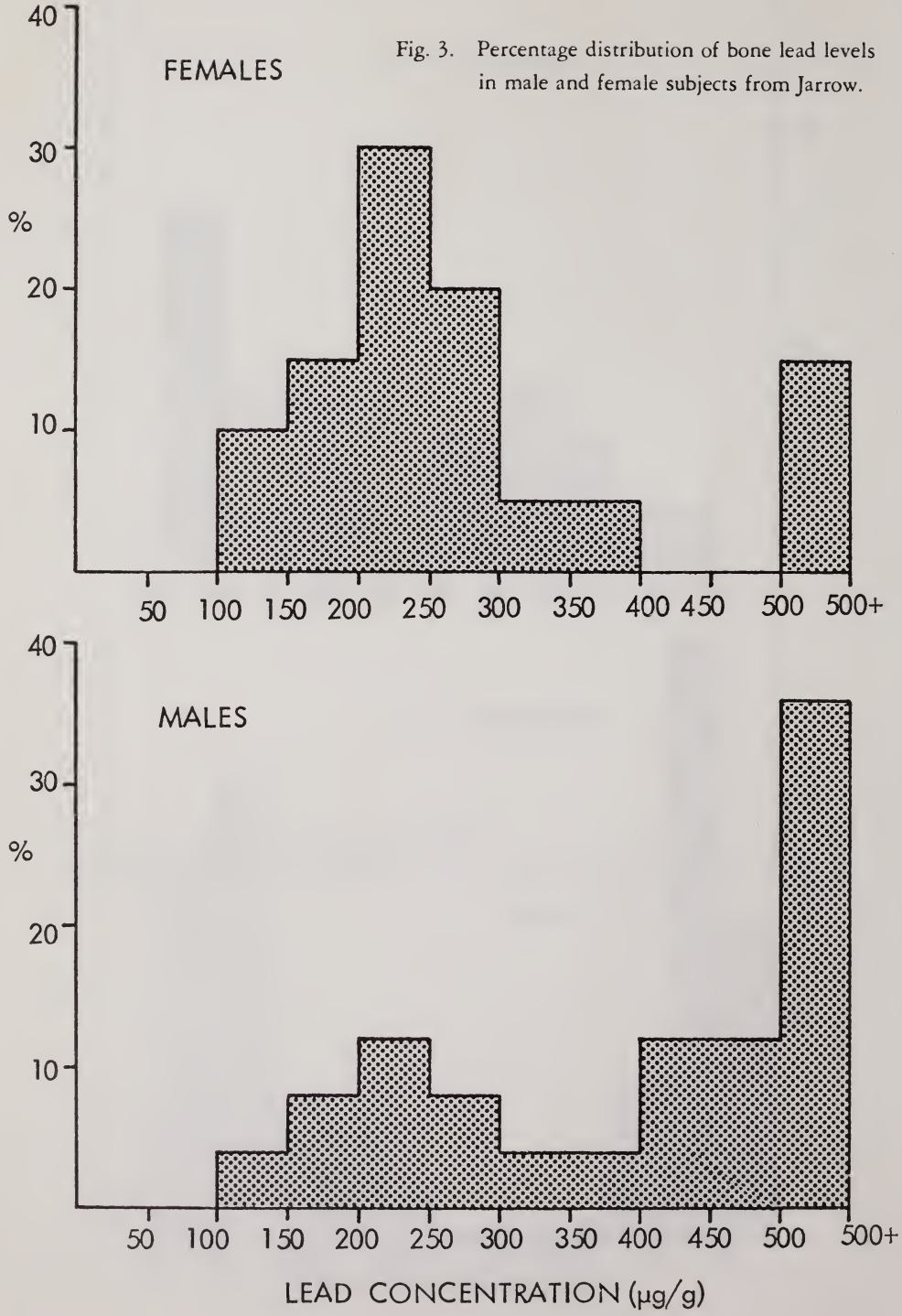


Fig. 3. Percentage distribution of bone lead levels in male and female subjects from Jarrow.

TABLE 1

Mean Lead Concentrations (μg/g dry weight) In Bones From Different Sites

		Bath (BC1600)	Danebury (Iron Age)	Verulamium (R/B)	Bath (R/B)	Cirencester (R/B)	Porchester Castle (A/S)	Iona (8-11th-C)	North Elham Park (A/S)	Red Castle (A/S)	Jarrow (A/S)	Monkwearmouth (A/S)	Bonhunt (9-12th-C)	King's Lynn (Medieval)	St. Paul' (Medieval)	St. Michael's (Medieval)
RIB	Mean	33.3	34.9		55.6	302.9	93.2		150.8				70.9	103.7		
	SD	8.3	4.5		27.7	135.7	51.1		51.6				33.4	33.3		
	n	6	35		10	99	21		5				101	4		
VERTEBRA	Mean					331.5										
	SD					138.6										
	n					61										
LONG BONE	Mean			30.6		190.4		36.2	139.2	121.9	375.5				200.1	203.8
	SD			4.7		93.6		4.8	80.1	28.0	216.7				155.2	205.0
	n			5		144		6	43	8	42				14	17
OTHERS	Mean					258.4	113.3	50.7	123.4	101.7	424.4	379.0	79.2			100.3
	SD					148.5	40.3	11.4	51.3	23.0	258.9	69.3	42.1			53.0
	n					12	4	6	52	6	21	2	33			2
TOTAL	Mean	33.3	34.9	30.6	55.6	255.5	95.2	43.4	131.1	113.2	391.8	379.0	73.0	103.7	200.1	192.9
	SD	8.3	4.5	4.7	27.7	133.7	50.3	11.3	65.2	27.1	230.7	69.3	35.7	33.3	155.2	196.4
	n	6	35	5	10	316	25	12	100	14	63	2	134	4	14	19

Sites are arranged so far as is possible in chronological order: there is some overlap between adjacent sites, however.

R/B - Romano-British
A/S - Anglo-Saxon

TABLE 2

Lead Concentrations (μg/g dry weight) in Different Bones from the Same Skeleton

	Rib	Vertebra	Ulna
Mean	310.9	337.5	180.7
SD	156.1	153.5	76.6
n	43	43	43

TABLE 3

Correlation Between Lead Levels in Different Bones

	Correlation coefficient (r)	P
Rib : vertebra	0.62	<0.001
Rib : ulna	0.29	ns
Vertebra : ulna	0.25	ns

from the analytical point of view. It also suggests that lead is dispersed in a reasonably homogeneous way throughout the substance of the individual bones.

Lead in teeth

Forty-nine teeth from Cirencester were analysed, and found to contain much lower concentrations of lead on average than the bones. The mean concentration was 45.4 μg/g (SD 37.1) with a range from 1-60 μg/g.

COMMENT

Assuming that the concentrations of lead which we have found are a true reflection of the degree to which the individuals were exposed during life, our findings raise two important questions: first, what was the source of the lead, and second, what effect might this exposure have had on the health of the individual?

Validity of the results

One obvious source of contamination which has to be considered is lead in soil. We have already discussed this matter in some detail in an earlier paper and the conclusion to be drawn seems to be that in conditions which favour good skeletal preservation, lead is unlikely to move from soil to bone to any significant extent. In some soil samples which we obtained from Cirencester the lead content was low (mean 13.5 ppm), which makes contamination unlikely in this site at least.

Additional features which militate against contamination are the wide spread of values in most sites (Figures 1 and 2) and the fact that the high values are spread throughout the sites and show no evidence of spatial clustering. We can conclude, therefore, that, in general, our findings are indicative of exposure to lead during life. That contamination may occur under some circumstances, however, is evident from some of the exceptionally high values which were reported and to which further reference is made below. We also reserve our judgment on the Jarrow results until we have undertaken geological studies.

Sources of lead

How did the lead get into the individuals of the different populations recorded here? As we have pointed out, lead is taken up by the skeletal tissues during life. Only rarely, because of exceptional archaeological conditions, does it penetrate into bones after burial. The problem, therefore, is primarily one for the archaeologist or historian, not for the soil scientist or geologist. It would be pretentious to claim that we could identify all the sources from which lead could have been ingested at each of the sites for which we have records. However, these sites may be grouped into a few broad categories which had a number of important features in common. The most useful of these categories is that which is based simply on chronology, because the date at which any of these peoples lived largely determined what metallurgical techniques were available to them and the overall part played in their lives by substances containing lead.

In the neolithic period the use of metals had not yet begun, except for the few rare instances in which naturally occurring nuggets of native copper and gold were worked cold by beating. No such localities have provided us with osseous material.

From about 2500 B.C. a number of different groups of Beaker people came to Britain, bringing with them objects of gold, copper and perhaps bronze and also the knowledge of how to work metals. By 2000 B.C. the Bronze Age was well established in this country and it became characterized by the extensive use of that metal both for weapons and for domestic purposes. Swords, axes, palstaves, sickles, cauldrons, tools for carpenters and harness makers, some personal ornaments, and many other objects were in common use. As a result of this new activity many persons must have been brought into contact with the component metals of this alloy. These persons would have included the miners who extracted the ores, the smelters who reduced them, the smiths who worked the ingots, and everyone who handled the manufactured product — especially, perhaps, those who habitually ate food cooked in bronze vessels or served on bronze plates. It may be objected that bronze is an alloy of copper and tin in which lead is present only as a trace element, usually in amounts which are unlikely to be toxic. This may be partly true of artifacts dating from the Early Bronze Age but does not apply to material of later date. Analyses of Late Bronze Age objects have shown that it became a common practice for smiths to add lead to the copper-tin alloy.

This greatly improved the casting qualities of bronze although it led to slight reduction in its hardness. The added lead is often in the range of 4 to 8% and in some instances was as high as 10%. A further innovation of Bronze Age craftsmen was to use lead alloyed with tin or copper as a solder. The amount of lead absorbed by the body, however, depends not only on its chemistry and concentration but also on the way in which it is presented, since certain substances are known to give a degree of protection by reducing the amount of lead which is taken up by the tissues. The most important of these is calcium, and it is worth noting that the Bronze Age populations of this country were predominantly geared to an economy of pastoralism from which they obtained ample supplies of milk, and also of meat, in their diet. In this respect they contrast with later groups such as the Anglo-Saxon and medieval peoples who were primarily agriculturists and grain farmers with a much lower average intake of calcium.

In the subsequent Iron Age the extraction and forging of the new metal was less likely to involve contact with lead. As far as is known, lead was never deliberately alloyed with iron. But although the period takes its name from this important advance in technology it must be remembered that iron, being very difficult to extract from its ores, was therefore highly prized. For a long time it probably remained the valued material of an economic or social elite. Bronze, on the other hand, was easy to work and readily available, so that both in Britian and on the continent it continued to be the most commonly used metal even though the "Iron" age had arrived.

In the Romano-British period the use of lead became much more common, especially in its unalloyed state. The Romans very greatly extended the use of this metal, and its potential toxicity must have been given ample scope to reveal its effects by reason of certain specific ways in which it was used. First, it was employed to make pipes for bringing water into the houses (Pliny, *Nat. Hist.*, 31, 31). The dangers of lead poisoning no doubt varied regionally, depending on the physical and chemical nature of the water supply, but Roman plumbers and water engineers were well aware of these risks. Vitruvius (*De Architectura,* 8, 7, 10) clearly stated that "water is much more wholesome from earthenware than from lead pipes. For it seems to be made injurious by lead, because white lead is produced by it; and this is said to be harmful to the human body [*haec autem dicitur esse nocens corporibus humanis*]." A second potentially hazardous use of lead was in the making of pewter. This substance is chiefly a lead-tin alloy and was used extensively to make drinking vessels and food plates. When meat was cut on the latter, small quantities of the metal could easily be scraped off and ingested. Lead or pewter containers were also used in the manufacture or storage of wine. Roman pewter of good quality contained at least 70% tin, often considerably more.

Another widespread source of pollution by lead was the mining of its ores. The

most popular of these in the ancient world, and the easiest to work, was galena (PbS). Galena was, however, not mined exclusively for its lead content: it was also a source of silver. The mountains of eastern Anatolia contain immense deposits of galena, some of the lodes in Karahissar yielding as much as 17,000 grams of silver to the ton (1.7%). Fortunately the mining of galena does not often produce clinical plumbism, probably because lead sulphide is relatively insoluble in the tissue fluid of the lungs. But other lead ores such as cerussite ($PbCO_3$) which are often found in association with galena, are much more dangerous. Still another source of ingested lead was lead acetate, which was sometimes used deliberately as a sweetening agent in wines and other dishes — hence its name "sugar" of lead — but was also formed spontaneously from sheet lead in the presence of acetic acid. The latter, of course, was well known to the ancients in the form of crude wine vinegar. All these and many other uses of the metal which were known to the classical world were brought to Britain after the Roman conquest. All have left archaeological evidence at a number of widely separated sites. We may also note that, together with Spain, Britain was a principal source of lead in the Roman Empire. Mines in the Mendips, Shropshire, Derbyshire, and Flint were exploited on a large scale. One other interesting use of lead ore may be mentioned: powdered galena in oil was a popular cosmetic in antiquity. Its use for this purpose is described in "Aristotle's " *De Petris*, a work which was probably written by a later Arabic author.

The Anglo-Saxon period, especially the early or pagan phase, is more obscure. Written records are scanty at best and usually are non-existent. Archaeologically there is evidence of the use of sheet bronze in pagan Saxon times, but few analyses have been made and there is very little evidence about its chemical composition, including its content, if any, of lead. Bronze weapons were also used by these people but it is not yet known to what extent the early Saxons prepared their own supplies of the metal, how much they reused old weapons and weapon metal taken over from the departing Romans, or whether they obtained supplies by trade and barter from the more metallurgically advanced peoples of southern Europe. It may be significant, however, that at the pagan Saxon village of Mucking, Essex, a lead vessel was found and a solidified puddle of molten lead was present on the floor of one of the huts.

Since lead and silver are usually found in close association — today 40% of the world's silver is obtained from the smelting of lead — it becomes important to know when silver was used and to what extent. In the Anglo-Saxon period much use of silver was made for coinage. The earliest pieces were minted in the late 7th century and by the end of the 8th century the coinage was numerous and varied. But here, again, difficulties arise because it is not yet known whether these people themselves prepared the metal by cupellation or merely imported it ready made. Pewter, which disappeared at the end of Romano-British times, was reintroduced in the late Saxon period.

In the medieval period developing urbanization was accompanied by the increased use of all metals, among which lead and silver were in especially high demand. The former came into use for roofs, notably church roofs, and for down-pipes, cisterns, and the like. Pewter platters and mugs were used increasingly, but compared with the earlier Roman alloy, which often contained less than 30% of lead, medieval pewter usually had a much higher proportion of this metal and correspondingly less tin. Vessels of lead were used extensively for making cider or perry, the resulting toxicity being well known in the post-medieval period by the name "Devonshire colic." It was during the late medieval period that lead glazes on pottery began to be used more extensively, a practice which thereafter constituted one of the most hazardous associated with the metal.

It will be seen from this brief review that, in general, each of these chronological periods was characterized by exposure to sources of lead which we might expect to detect in skeletal remains. There are, however, certain situations which cut across the different eras. One of these is well illustrated by the sites of Jarrow Monastery on the Tyne, and Monkwearmouth of the Wear. These localities are less than 10 km apart and the two rivers have their sources within about 3 km of each other in an area where there are extensive deposits of galena which have been mined for their lead content from prehistoric times until the present century. Rain wash, of necessity, carries large amounts of lead salts into the upper reaches of the rivers, which, especially in earlier times, were drunk by the populations living along both streams. Independently of any metalworking which these groups may have practised, this seems a reasonable explanation of the very high lead levels found at these sites. As we suggested earlier, however, this may not be the whole story.

Another difficulty of interpretation is our archaeological ignorance about who handled and prepared the metal. We know that in the medieval period increasing specialization had led to metalworking becoming the occupation of a very small minority. And we can reasonably assume that in Iron Age times the technical difficulties of handling that metal must have called for the expertness of specialists. In these circumstances we might expect that the mean lead content for the population would be fairly low, but a few persons, such as the professional smelters and smiths, would have levels much in excess of the average. This would apply especially to smelters because, apart from the oral ingestion of highly toxic compounds of lead, exposure to fume is more conducive to absorption of the metal than most other forms of contact. Vitruvius (*De Architectura* 8, 7, 11) also noted this, saying: "We can take example from the lead workers whose complexions are marked by pallor. For when, in casting, the lead receives the current of air, the fumes coming from it pervade the members of the body and rob the limbs of the virtues of the blood." For bronze, with its frequently high content of lead, we can be less sure. Many hoards of bronze ingots and scraps have been found, probably the stock in trade of itinerant bronze-smiths, but the metal was in

fact easily worked and it may be that most families had one or two men in their ranks who used it for commonplace do-it-yourself jobs and called on the skill of a specialist only when some unusually elaborate or difficult object was required. In such a community the mean lead content might be rather higher but still with striking concentrations in a few individuals. This may, perhaps, explain what we have found in the North Elham population (Figure 1). Compared with groups such as these a very different picture would be expected from a Roman (or romanized) town in which many persons obtained their water through lead plumbing, kept their wine in lead jars, and sweetened their crab apples with lead acetate. But again problems of interpretation arise. Whatever our expectations may be, it is often archaeologically difficult to judge the status of a settlement. For example, since Verulamium is well known to have been an important town during the Romano-British period, the very low mean level of lead in our sample (29μg/g) would seem paradoxical. However, in this case the explanation appears to be that the actual site from which these skeletons came was an impoverished fringe settlement of native Britons, undoubtedly "romanized" in the sense of being under Roman rule and presumably aware of Roman technology, but probably participating in it at a relatively humble level. They may still have obtained their water from surface supplies or through cheap wooden and earthenware pipes, and seldom enjoyed the praetorian amenities of choice wine, "sugared" fruits, and other toxic delights. It is clear that these Verulamians had a very different life style from the inhabitants of York and Cirencester, many of whom were likely to have been ex-legionaries, militiamen, civil servants, or well-to-do tradesmen exposed to a somewhat more elegant — and dangerous — cultural level.

Although our concern here is with lead that has been ingested during life, the presence of lead which has come into contact with the corpse after death, and especially after burial, cannot be ignored entirely. In Bronze Age, Roman, and pagan Saxon times a wide range of objects was placed in graves, and many of them were made of bronze or other alloys containing lead. Although the metal is no longer actively taken up by bone after death, its presence on or beside the body may result in high levels in the surrounding soil. When this lead eventually penetrates into the medullary cavity and the Haversian canals, it may be difficult to discriminate between post-mortem infiltration and intra-vitam absorption. The problem of grave goods seldom arises in Late Saxon or medieval contexts, although there are exceptions to this. The 12th-century skeleton of an elderly man from Thetford, Norfolk, had a lead ampulla beside it. Since this person had a severe disease of one hip joint it is possible that the ampulla had originally contained holy water from a healing shrine, perhaps Walsingham. Pilgrims' badges, in the form of lead plaques, are also found.

Other sources of lead may give high levels in the surrounding soil. Lead coffins, which were not uncommon in medieval and especially in later times, were also

sometimes used in the Romano-British period. Bronze, brass, and other alloys containing lead were used as coffin plates and are extremely common in post-medieval times. More diffuse and widespread sources of lead in the soil are church roofs, down-flow pipes which drain their gutters, cisterns into which rainwater debouched, and sometimes railings or mortsafes which protected individual graves. All these potential contaminants of bone need to be distinguished carefully from lead ingested during life. That this is a hazard not easily avoided is shown by a few freak results which we obtained for some of our samples. The outstanding one came from a 17th to 19th century burial in Norwich with a lead level of 45273 μg/g; the concentration of lead in the bones exceeded 4½%. This is totally impossible as an ante-mortem value but some much lower levels (e.g. 3083 μg/g from a Jarrow Monastery skeleton or 2219 μg/g from St. Michael's, Norwich) seem almost as improbable. These persons would presumably have died of plumbism long before such levels were reached.

Effects of health

The mean concentration of lead in the bones of the present-day population is said to be within the range of 16 to 40 μg/g;[2] correcting for the differences in composition of antique and modern bones, an upper limit of 'normal' would be about 60 μg/g if exposures were comparable.[3] The bones from several of the sites which we have studied show mean levels in excess of this, a fact which does not necessarily imply that lead poisoning was rife in the populations which our samples represent. For example, if large (but sub-toxic) amounts of lead are absorbed over a long period, concentrations in the bone will be correspondingly great.

Lead workers are an obvious example of those who may be subjected to prolonged heavy exposure and, as expected, their bones may contain several times the 'normal' concentration of lead; levels in excess of 200 μg/g have been reported.[4] On the other hand, an enhanced intake of lead may also be due to environmental factors. In Glasgow, where the water is extremely plumbosolvent, mean levels of lead in bones are almost twice those in a hard water (non-plumbosolvent) area, and in one study of autopsy material[5] 6.5% of the levels

2. J.S. Hislop and A. Parker, *Lead in Human Tissue* (London, 1971).

3. For details of the correction factor see Waldron *et al,* "Lead content of Romano-British Bones," cited in note 1.

4. P.S.I. Barry and D.B. Mossman, "Lead Concentrations in Human Tissues," *Br. J. Ind. Med.* 27 (1970):339-351.

5. M.D. Crawford and D.G. Crawford, "Lead in Bones and Drinking Water in Towns with Hard and Soft Water," *Br. Med. J.* 2 (1973):21-23.

were in excess of 200 µg/g. Although the highest value was 540 µg/g, none of the patients had symptoms of plumbism. Chronic, heavy exposure to lead, then, may not be an immediate threat to life, although it may well be accompanied by an increased morbidity.

If high levels of lead in the bones of adults cannot be taken as necessarily implying a diagnosis of lead poisoning, conversely, levels within a normal range do not exclude it. Most cases of severe clinical intoxication result from the absorption of unusually large amounts of lead over a relatively short period. Now if previous exposure has been slight, concentrations of lead in the bones before the onset of symptoms may be correspondingly low; although they will certainly rise as the result of the intoxicating dose, the increase may still be insufficient to raise the levels beyond the range of normal values.

The same difficulties apply to the interpretation of lead levels in the bones of children, although high concentrations in very young children are more suggestive of clinical intoxication, since such children appear to tolerate an increased burden of lead poorly. An adjunct to diagnosis would be the demonstration of a radiological 'lead line' in the bones, since this is normally found in children with lead intoxication. We hope to be able to x-ray some of the juvenile bones from Cirencester in order to assess the prevalence of lead poisoning amongst them.

London School of Hygiene and
Tropical Medicine
Gower Street
London WC 1E 7HT, England

Making Therapeutic Decisions with Protopharmacologic Evidence

J. WORTH ESTES

MEDICAL practice has relied for several thousand years on drugs to alleviate pain and other symptoms of disease. Pharmacology as a separate scientific discipline began to emerge in the mid-nineteenth century, when Rudolf Buchheim went to the German university at Dorpat, in what is now the Estonian S.S.R. In the basement of his home in that city he established the first laboratory of experimental pharmacology, where he and his students worked until the university created a new laboratory for them in 1860.[1] It had not been possible to set up such a laboratory much earlier, because not until then could modern chemical techniques provide pure drug substances with constant physicochemical properties for careful study of their effects. Moreover, not until then could biology provide enough information about the properties of living matter to permit its use in studying the effects of drugs in isolated organ systems or in intact animals and men.

Although pharmacology as a distinct academic discipline appeared only 120 years ago, drugs have been used therapeutically since before the time of Hippocrates. The word "pharmacology" has been used since at least 1683, but not until about 1880 did it take on its present meaning,[2] when the preparation of medicines was finally excluded from its definition, partly as a result of Buchheim's arguments. The ways in which pharmacological questions were solved before about 1850 differed from those that are conventional today, but the early studies were part of the continuous evolution toward today's experimental approaches.

The late Chauncey Leake, who, like Buchheim, was both a distinguished pharmacologist and an historian, and who in 1975 published the first book-length English-language history of pharmacology, invented the word "protopharmacology," encompassing drug studies performed before the emergence of modern pharmacology over the past 130 years. Leake's word provides a focus

---

Adapted from a lecture presented at the eighth annual New England Pharmacologists' meeting, Norwich, Connecticut, 9-10 February 1979.

1. B. Holmstedt and G. Liljestrand, *Readings in Pharmacology* (New York: Macmillan, 1963) 76-78.

2. *Oxford English Dictionary*, s. v. "Pharmacology."

within which we can examine the kinds of evidence that our professional ancestors used in making decisions about drugs. He defined protopharmacology as drug studies that were mostly empirical, that is, they were based chiefly on physicians' experiences with their patients.[3] Protopharmacologic conclusions were developed largely through painstaking observations, and through the application of contemporaneously prevalent physiologic and pathologic ideas to those observations. Throughout the long era of protopharmacology we find very few examples of conscious experimentation, utilizing concepts like positive and negative controls that are commonplace today.

In spite of the seemingly primitive nature of drug studies before 1850, however, physicians had been concerned with problems of efficacy and safety for centuries before the 1962 Kefauver-Harris Amendments to the Food and Drug Act required that we take both into account. Protopharmacologists based their conclusions about the efficacy and safety of drugs largely on three kinds of evidence.

The first of these is *empirical evidence*, in the sense that Leake intended. For instance, whenever administration of a drug was followed by the patient's recovery, the physician could conclude that the drug had caused the recovery. Similarly, if a patient vomited or became paralyzed after the administration of a drug, the drug must have caused the observed toxic effects.

The second kind of evidence was based on *rationalism*. For instance, consider the drug treatment of a patient with an illness whose pathology has been explained in the medical literature in a specific way. Rational thought demanded that the patient must benefit from exposure to any drug that, also according to authoritative sources, should correct the disease process. If the patient did not get better, contrary to his physician's expectations from the literature, the diagnosis might have been wrong, or divine providence had intervened.

The third, and rarest, protopharmacological evidence was *experimental evidence,* typified today by data permitting comparisons among groups of patients, or between drugs. Such studies do not rely on preconceived notions to explain, or to explain away, observed results. Until statistical methods for facilitating biological comparisons were developed late in the nineteenth century, they could be made only infrequently.

Protopharmacology can best be explored by studying examples of each of the kinds of evidence that it utilized. Empirical evidence is exemplified by anecdotal

---

3. Chauncey D. Leake, *An Historical Account of Pharmacology to the Twentieth Century* (Springfield, IL: Charles C. Thomas, 1975) 17. The first journal article on historical pharmacology was concerned exclusively with pharmacodynamics: Theodore Koppanyi, "The Rise of Pharmacology," *Scientific Monthly* (October, 1935): 316-325. Another overview of historic advances in therapeutics is: J. P. Bull, "The Historical Development of Clinical Therapeutic Trials," *Journal of Chronic Diseases* 10 (1959): 218-248.

descriptive data. For instance, the pharmacologic effect of the poison hemlock was reported by Plato, who was present when Socrates was executed in 399 B.C., having been sentenced to death on a charge of introducing new deities and corrupting youth: "[Socrates] walked about until, as he said, his legs began to fail, and then he lay on his back, . . . and the man who gave him the poison now and then looked at his feet and legs; and after a while he pressed his foot hard, and asked him if he could feel; and [Socrates] said, No; and then his leg, and so upwards and upwards, and showed us that he was cold and stiff. And [Socrates] felt them himself, and said: When the poison reaches the heart, that will be the end. He was beginning to grow cold about the groin, when he uncovered his face and [spoke for the last time] . . . In a minute or two a movement was heard, and the attendants uncovered him; his eyes were set, and Crito closed his eyes and mouth."[4]

Plato could not have known that coniine, the active principle in poison hemlock *(Conium maculatum)*, paralyzes motor nerve terminals. He could know only, in the words of Dioscorides, the pioneering herbalist of the first century A.D., that plant's property of "killing by its coldness."[5] It was this kind of evidence, and the limited physiological inferences possible from it, that for two to three millenia provided the major basis for evaluating toxicity.

The earliest data from which a "log dose-effect curve" can be constructed were reported by Dioscorides when he discussed the effects of the Jimson weed *(Datura stramonium)*. He noted that one dram of the drug produces "not unpleasant fantasies," two drams "make one beside himself for three days," and four drams are lethal.[6] On the other hand, Dioscorides had no notion that each doubling of a dose represents a logarithmic increment; Napier did not describe logarithms until 1614. Whatever the temptation, we cannot consider Dioscorides the inventor of the log dose-effect curve, but only another reporter of empirical anecdotal data.

The pervading influence of rationalism in protopharmacology is illustrated in the pathophysiologic principles that dictated most therapeutics until well into the nineteenth century. Until Buchheim opened his basement laboratory, pharmacologic rationalism was based on Hippocratic and Aristotelian concepts of the humors, especially as perpetuated by the extraordinarily prolonged influence of Galen, who lived in the second century A.D.

---

4. Plato, *Phaedo,* 117d-118a. Tr. Jowett, Third edition. (Reprinted, New York: Random House, 1937).

5. Robert T. Gunther, ed., *The Greek Herbal of Dioscorides,* John Goodyer, trans. (1655; Oxford: Oxford University Press, 1934) 477-478.

6. Ibid., p. 470.

The underlying premise of humoralism — admittedly oversimplified here — was that all diseases could be considered as imbalances in the four humors: blood, phlegm, yellow bile, and black bile. When the humors were in their normal, proper balance — that is, when the body was in health — the associated elemental properties (hot, dry, wet, and cold) would also be in balance. If one or more humors was much out of balance, either an excess or a deficit of one or more of their associated properties would result.[7] When, for example, Dioscorides explained the lethal effects of poison hemlock by its "coldness," he was merely pointing out the specific humoral excess produced by the drug.

A sixteenth-century application of humoral theory to practical drug therapy is exemplified in Ambroise Paré's summary of the effects of humoral imbalance on the body, shown in an abbreviated form in Table 1, which reflects the pathophysiological concepts that dictated the busy surgeon's therapeutics. If cold is only modestly excessive, the body or its affected organs will cool, condense, or become obstructed. As a result, excessive phlegm, the corresponding humor, will flow, at least until the cold forces become so strong that the phlegm is itself obstructed. When the cold stimulus becomes maximum, death will occur.

Only some of the effects of excessive heat were exactly opposite in quality to those of excessive cold. Other supposed effects of heat must have been easier to diagnose than those of cold; many of them are analogous, or metaphorically related, to well-known properties and results of fire, such as reddening, consumption, and scarring, and could be seen, whereas the hallmarks of cold could only be postulated. The effects of excessive moisture and dryness are similarly derived. Paré seems not to have considered death as a primary expected effect of heat, moisture, or dryness, although he must have observed that patients certainly did die following illnesses thought to represent imbalances of those properties. He may have considered excessive coldness as a terminal event in such diseases (perhaps because a dead body always became cold), and would have directed his therapy toward preventing the addition of coldness to his patient's underlying problems.

---

7. For more detailed explanations of Galen's influence, see: Owsei Temkin, "Galenicals and Galenism in the History of Medicine," in Iago Goldston, ed., *The Impact of Antibiotics on Medicine and Society* (New York: International Universities Press, 1958) 18-37; Lester S. King, "Medical Theory and Practice at the Beginning of the 18th Century," *Bulletin of the History of Medicine* 46 (1972): 1-15; Owsei Temkin, *Galenism: Rise and Fall of a Medical Philosophy* (Ithaca, NY: Cornell University Press, 1973). In the last work, Temkin suggests a reason for the extraordinarily long time required for drug studies to shift from their focus on the patient to a new focus on the specific properties of drugs themselves: "The strength of Galenism reposed in no small measure in its having provided medical categories, like the temperaments [sanguine, phlegmatic, choleric, and melancholic], for relating the individual to health and disease. Their scientific reinterpretation might be desirable, but their abandonment was not." (p. 179).

TABLE 1

The pathological effects of humoral imbalances as outlined by Ambroise Paré in the sixteenth century. Effects above the horizontal line result when the stimulus is "moderate," while effects below the line result when it is "immoderate."

COLD	HEAT	MOISTURE	DRYNESS
Cools	Heats	Humidifies	Dries
Condenses	Thins	Lubricates	Rarefies
Obstructs	Opens Passages	Smoothes & Softens	Thins
	Rarefies	Glues	
	Digests		
	Suppurates		
	Resulting in:		
Congeals	Inflames	Obstructs	Binds
Stupefies	Burns	Produces Flatulent Tumors	Contracts or Shrinks
Kills	Bites		Causes Chapping
	Violent Attraction		
	Reddening		
	Consumption		
	Wasting		
	Scarring		
	Gangrene		

SOURCE: Ambroise Paré, *The Collected Works,* Thomas Johnson, trans. (1634; repr. ed. Pound Ridge, NY: Milford House, 1968) 1029-1030.

Rational therapeutics then, was accomplished by giving the patient medicines that were expected to restore his humoral balances. Table 2, which is also abstracted from Paré's work, shows how some of these ancient expectations led to therapeutic methods that are inconsistent with modern knowledge, but which were entirely consistent with protopharmacologic physiology. Today, of course, we would be unlikely to use an agent that promotes evacuation from the bowels to treat an illness characterized by diarrhea. But when potent new drugs such as jalap and ipecac were introduced at about the time that Harvey demonstrated that the blood circulates, 38 years after Paré's death, the new drugs could be included among the drugs that would open the body, including the bowels, to permit

whatever noxious material was causing the illness to escape from the gut, at either end. Consequently, diarrhea and dysentery came to be treated with cathartics.[8]

TABLE 2

Properties of Galenic drugs, and some examples, as recognized by Ambroise Paré in the sixteenth century.

COLD	HOT	MOIST	DRY
Condense	Rarefy	Soften	Harden
Repercuss	Attract	Relax	Stiffen
Shut Up	Open		
Thicken	Thin		
Irritate	Smooth		
Constipate	Cleanse		
	Examples		
Nightshade	Ammonia	Ammonia	Aloe
Cucumber	Squills	Cucumber	Nutmeg
Wines	Mandrake	Violets	Wormwood
Opium (for diarrhea)	Opium (for pain)	Lettuce	Onion

SOURCE: Ambroise Paré, *The Collected Works,* Thomas Johnson, trans. (1634; repr. ed. Pound Ridge, NY: Milford House, 1968) 1031-1032.

Other facets of protopharmacologic practice are also illustrated in Table 2. For instance, some drugs, such as ammonia, could be assigned to two different drug classes, but not to direct opposites. Ammonia was used both as a hot drug and as a moist drug, properties that were probably suggested by its obvious physicochemical properties, while cucumbers were cold and moist. Paré could prescribe opium, a "cold" drug, for patients with diarrhea, and its tincture, laudanum, as a "hot" drug for alleviating pain, which he took to be a symptom indicating a surfeit of coldness.

8. Ambroise Paré, *The Collected Works,* Thomas Johnson, trans, (1634; repr. ed. Pound Ridge, NY: Milford House, 1968) 1042-1043.

He regarded aloe, still sometimes used for its cathartic property, as a dry drug; its source, the cactus-like *Aloe barbadensis,* must have suggested its putative drug property, while clinical observation revealed its indisputable cathartic effect. Most of Paré's materia medica consisted of drugs with no pharmacologic properties that can be recognized today, an example being lettuce. Lettuce leaves obviously contain water, hence he could consider them moist and, therefore, useful for treating illnesses characterized by dryness.

Rational attempts to restore humoral balances were solidly grounded in the necessity for making the system work, and for justifying it, as well as on empirical observations that the drugs were, in fact, beneficial to patients treated in the Galenic tradition. By the late eighteenth century, new concepts of altered nerve or arterial fiber activity (or excitability) had expanded physicians' concepts of the role of the humoral imbalances in pathology ("solidism").[9] Even without these new accretions, the ancient therapeutic system had become so vastly complicated and so full of contradictions that it was beginning to fall apart under its own weight and complexity. Nevertheless, doctors continued to exploit Galen's basic humoral pathophysiology because the evidence available to them at that time seemingly verified their humoral assumptions.

Protopharmacologic evidence relied more on *what* drugs did for patients then on *how* they did it, or on the drugs' selectivities of action. In 1701 John Jones assumed that all the opium preparations which he described had similar effects. It was only in the interest of providing useful practical information that he included a table of effective doses for fifteen opiates appropriate to people with different body builds. Table 3 shows the relative potencies of the opium preparations that Jones listed in his book; they are closely correlated with their respective content of opium (and, therefore, of morphine and codeine).[10]

We cannot use Jones' data to assess his patients' probable clinical responses to the opiates he prescribed, if only because Jones did not recognize that anxiety

---

9. Lester S. King, *The Medical World of the Eighteenth Century* (1958; repr. ed. Huntington, NY: Robert E. Krieger, 1971) 66-75.

10. J. Worth Estes, "John Jones' *Mysteries of Opium Reveal'd* (1701): Key to Historical Opiates," *Journal of the History of Medicine and Allied Sciences,* 34 (1979): 200-209. Recent evidence that orally administered opiates are clinically effective, in contrast to what is often implicit in modern medical teaching, supports Jones' assumption that the opiates he used were effective: William C. Farr, "Oral Morphine for Control of Pain in Terminal Cancer," *Arizona Medicine* 35 (1978): 167-170; D. W. Vere, "Pharmacology of Morphine Drugs Used in Terminal Care," in D. W. Vere, ed., *Topics in Therapeutics* 4 (London: Pitman Medical Publishing Co., 1978) 75-83. Although oral morphine is about one-seventh as potent as intramuscular morphine, and although oral morphine cannot achieve the same maximum intensity of pain relief, the oral route may provide effective analgesia for a longer period than can be expected from parenteral morphine, as was pointed out by Raymond W. Houde, Stanley L. Wallenstein, and William T. Beaver, in "Clinical Measurement of Pain," in George deStevens, ed., *Analgetics* (New York: Academic press, 1965) 93-94.

(which seems to have been his preferred indication for an opiate), pain, and diarrhea probably respond to different doses of narcotic alkaloids. Although Paré's Galenic frameword has already suggested that different effects *could* be expected from the same raw ingredient, Paré's omission of specific posologic recommendations precludes our comparing his uses of opiates with Jones'.

TABLE 3

Relative potencies of fifteen opium preparations available to London in 1701. Preparations 1-5 and 12 had been made since classical times; the remainder were late seventeenth-century formulations.

Preparation	Relative Potency
1. Mithridate	1
2. Diascordium	1
3. Venice Treacle (Theriaca Andromachi)	2
4. Philonium Romanum	9
5. Philonium Persicum	9
6. Starkey's, or Matthew's, Pill	37
7. London Laudanum	105
8. Dr. Bates' Pacifick Pill	105
9. LeMort's Extract	240
10. Wedel's Laudanum	240
11. The Solid Panacea	240
12. Diacodium (Syrup e Meconio)	0.7 oz. equivalent to one grain of Solid Panacea
13. The Liquid Panacea	20 drops equivalent to one grain of Solid Panacea
14. Sydenham's Laudanum	
15. Laudanum Liquidum Cydoniatum	

SOURCE: J. Worth Estes, "John Jones' *Mysteries of Opium Reveal'd* (1701): Key to Historical Opiates," *Journal of the History of Medicine and Allied Sciences* 34 (1979):200-209.

The oldest preparations listed in Table 3, like mithridate and diascordium, which had been compounded from more than fifty ingredients since Galen's time, were also the least potent. The most potent, like solid panacea and Sydenham's liquid laudanum, were the most recently introduced. The relative potency data suggest that protopharmacologic practice permitted less potent preparations to

disappear from common usage as newer, more potent, forms of the same drug became available. That is, the more predictably efficacious drugs could readily displace less dependable forms from practice, so long as the desired effect could actually be observed and not merely inferred.

Although numerical data were not used routinely to solve pharmacological problems until the twentieth century, such data could, and occasionally did, lead to new therapeutic decisions. Zabdiel Boylston probably used them in this way for the first time when he summarized the effects of the smallpox inoculations that he carried out in Boston in the winter of 1720-21. Although today we would not include immunization procedures among pharmacological studies, 250 years ago there was no good reason not to do so, since Boylston did not know about the immune response.[11]

Boylston's data showed that inoculation reduced the incidence of death from naturally acquired epidemic smallpox from 1 in 7 (15%) to 1 in 47 (2%) from the artificially-induced milder form of the disease. Therefore, inoculation was safer than running the risks inherent in an epidemic. It was already known that persons who survived an attack of naturally acquired smallpox did not contract it again. Similarly, virtually all Bostonians who had been inoculated failed to develop smallpox even during severe epidemics; therefore inoculation furnished effective protection from the disease. Physicians, then, could conclude that inoculation was justifiable, since it provided safe and effective protection; Jenner's discovery of the value of vaccination 90 years later added greater safety and greater ease of administration, but no special increase in efficacy.

James Lind's celebrated study of techniques for preventing scurvy on board HMS *Salisbury* (1747) has been cited as the earliest example of a controlled clinical trial.[12] Lind tried six different antiscorbutic treatments in six groups of two men each; only the men who received oranges and lemons, until the ship's supplies of the fruits ran out, recovered. However, Lind's protocol, summarized in Table 4, suggests that he did not set out to perform a controlled trial, a true experiment; its controls were recognized only by later commentators. All six treatments included acids, and all were regarded as "tonic"substances, thought to strengthen the body's fibers by a sort of exothermic Galenic action. Six years later Lind recommended concentrated orange juice, gooseberries, spruce beer, and onions as antiscorbutics appropriate for use on ships. A recent study has shown

---

11. Zabdiel Boylston, *An Historical Account of the Small-Pox Inoculated in New England* (London: S. Chandler, 1726) 40.

12. E.g., in Duncan P. Thomas, "Experiment versus Authority: James Lind and Benjamin Rush," *New England Journal of Medicine* 281 (1969): 932-934.

TABLE 4

The six antiscorbutic treatments that James Lind tried in groups of two men each on board HMS *Salisbury* in May 1747.

1. CIDER, 1 quart daily
2. ELIXIR VITRIOL (Sulfuric Acid), 25 drops daily
3. VINEGAR, 2 spoonfuls 3 times daily
4. SEA WATER, 1/2 pint daily
5. 2 ORANGES and 1 LEMON daily*
6. ELECTUARY (lozenge) of GARLIC, MUSTARD SEED, BALSAM OF PERU, and GUM MYRRH, 3 times daily; also, BARLEY WATER, TAMARINDS, and CREMOR TARTAR (Sodium Potassium Tartrate) and libitum

SOURCE: James Lind, *A Treatise on the Scurvy* (Edinburgh: A. Kincaid & A. Donaldson, 1753) 191-193.

*This treatment was continued for six days only, because the ship's supplies of the fruits ran out.

that, under conditions of shipboard storage, none of them could now be expected to provide the protection that Lind thought they would.[13]

Its seems historically premature to infer that Lind consciously employed positive or negative controls in his original study. Instead, he seems to have tried to compare the relative efficacies of six "tonics," one of which he found to be more effective than the others. In addition, the fact that, six years after his famous trial, Lind still recommended several possible antiscorbutics, none of which could have

13. R. E. Hughes, "James Lind and the Cure of Scurvy. An Experimental Approach," *Medical History* 19 (1975): 342-351. Lind thought the principal "predisposing cause" of scurvy was excessive moisture in the environment, and that the "secondary disposing causes" were preceding illness, a "lazy inactive disposition," and a "discontented melancholy humour." Their net results were diminished digestion and nourishment, leading to weakness and relaxation of the fibers, and culminating in diminished perspiration and, therefore, fluid retention. He reasoned that appropriate remedies would include mild cathartics, diuretics, digestives, and "acids of any kind," although past experience had showed that the latter were not entirely sufficient as either prophylaxis or cure. In the 1772 (third) edition of his *Treatise,* Lind stated that "the most quick and sensible relief was obtained from lemon juice" in his experiences over the intervening twenty-five years, but he still continued to recommend a number of other remedies, including wine, sugar, scurvy-grass, coconut tree sap, chamomile flowers, infusions of various parts of the fir tree, Peruvian bark, and malt. James Lind, *A Treatise of the Scurvy* (Edinburgh: A. Kincaid and A. Donaldson, 1753) 91-93, 103-108, 191-195, 207-223, 296-310; James Lind, *A Treatise on the Scurvy,* 3rd ed. (London: S. Crowder, and others, 1772) 520-526.

been effective, suggests that his trial did not lead him to make a firm therapeutic decision. His data exemplify the collection of experimental evidence only in retrospect. Because Lind did not choose to use only one remedy for scurvy, we cannot really fault the British Admiralty for waiting fifty years to provide citrus fruits on all its ships. It did not ignore Lind's work, but neither he nor the Admiralty Board could even recognize that he had proved very much, so long as humoral concepts of disease and its treatment still prevailed.[14]

Herbals and textbooks of the eighteenth century have long been taken to be representative of its use of drugs. However, such publications may not be reliable indicators of overall professional consensus, because their recommendations were based more on individual opinion, on empirical evidence, and on traditional authority than on uniform criteria for assessing the efficacy of drugs. In short, eighteenth-century protopharmacology was derived very logically from the premises implicit in humoral theory, a theory which had not yet undergone rigorous testing. No disturbances of humoral balance, or of arterial or nervous activity, had been demonstrated conclusively, but neither had they been challenged, much less replaced, by alternative concepts. Therefore they retained their ancient authority.

The actual therapies prescribed by eighteenth-century physicians can be more readily identified in their daybooks and ledgers than in their texts or letters. For instance, in the late eighteenth century, colonial New England physicians used about 225 different drug preparations, made from 100 different raw active ingredients. Table 5 shows the distribution of those drugs among the twenty-two drug classes defined by James Thacher in his *American New Dispensatory* (1810), then regarded as an excellent reflection of common therapeutic practice over the previous half-century.[15]

Each of the twenty-two drug classes (except for the externally applied inert plasters) was thought to rectify a different kind of bodily imbalance, although we do not know just how the specific properties of any drug had been ascertained in the first place, save perhaps by inferences like those described earlier for lettuce and aloe. However, drug therapy was now more complex than in Ambroise Paré's time, two centuries earlier. Thacher consolidated the drug classes into three larger categories. About 90% were thought to be stimulants, of the entire body or

---

14. For a detailed narrative of the events which led to the Admiralty Board's decision, see: Christopher Lloyd, "The Introduction of Lemon Juice as a Cure for Scurvy," *Bulletin of the History of Medicine* 35 (1961): 123-132. Lind's arguments for citrus fruits seem to have reached the Admiralty more through personal contacts than through his books.

15. Jabez Dow to Dr. Joseph Burden, Tamworth, NH, 11 August 1810, in "Manuscript No. 1" manuscript blank book in Jabez Dow Papers, Boston Medical Library, p. 84.

TABLE 5

Frequencies with which drugs in the twenty-two classes recognized in James Thacher's *American New Dispensatory* of 1810 were used in the practices of four colonial New England physicians.

I. STIMULANT DRUGS		II. CHEMICALLY ACTING AGENTS	
Cathartics	24.95%	Refrigerants	2.91%
Tonics	14.26%	Escharotics	0.62%
Narcotics	13.91%	Antacids	0.57%
Astringents	9.86%	Lithontriptics	0.03%
Antispasmodics	5.24%		
Epispastics	4.68%	III. MECHANICALLY ACTING AGENTS	
Emetics	4.45%		
Diaphoretics	2.02%	Emollients	3.21%
Diuretics	1.66%	Plasters	2.71%
Expectorants	0.23%	Demulcents	2.44%
Sialogogues	0.22%	Anthelminthics	0.76%
Emmenagogues	0.11%	Diluents	0.0%
Errhines	0.01%		

SOURCE: J. Worth Estes, "Therapeutic Practice in Colonial New England," in Philip Cash, Eric H. Christianson, and J. Worth Estes, eds., *Medicine in Massachusetts, 1630-1800* (Boston: Colonial Society of Massachusetts, 1980), in press.

parts of it. The six most commonly used classes were considered to be rather general stimulants, like the acidic tonics that Lind thought were effective in scurvy, and their effects were thought to be primarily on the blood, because it was believed to be affected in most disease processes.

The last seven stimulants listed in Table 5 were thought to stimulate specific secretory organs — the stomach, sweat glands, kidneys, lungs, salivary glands, uterus, and nasal mucosa, respectively. The low frequencies with which the classes associated with specific organs and their natural secretions were used suggests that the restoration of natural humoral balances was no longer to be achieved simply by counteracting abnormal humors with drugs of merely opposite effect. For instance, the entire list contains no drugs that were expected to increase body heat, as we might have expected for treating patients with primarily cold diseases, at least from Paré's list of two centuries earlier. Warm clothes and hot food had replaced drugs for accomplishing this therapeutic goal, just as ventilation of the sickroom, light clothes, and cool drinks were used to counteract fever, or heat.

It is difficult to reconcile some of these historical concepts of drug action today. For instance, most of the drugs called narcotics both now and then are opiates, which we now recognize to be general depressants. How, then, did they come to be considered as "stimulants" in the past? First, it seems that, in the eighteenth century, when many diseases were thought to represent deficient bodily function, virtually any drug which could be demonstrated, however empirically, to counteract such illnesses *must* be a stimulant. Second, today constipation is regarded as a side effect of opiates, but then opiates were given in order to treat diarrhea, perhaps even more than to treat pain. It is easy, then, to follow our professional ancestors' probable reasoning, that if such drugs can inhibit intestinal action, they must do so by stimulating the bowel sphincters and other gastrointestinal fibers to contract.

The second major category of drug actions encompassed agents that acted chemically, but these were seldom employed. Stimulant drugs such as cathartics and astringents were used to treat fevers, to rid the body of whatever it was that was causing the patient's illness, not (as we noted earlier) refrigerants, which would be expected to lower body temperature. It is, of course, difficult for us today to understand how colonial physicians could diagnose gastric hyperacidity, much less uric acid stones (lithontriptics were supposed to dissolve lithic acid, the old name for uric acid). The last major category, of drugs that were thought to act mechanically by preventing interactions among particles, made up only about 9% of colonial remedies. (Anthelminthics were thought to expel worms from the gut, not to poison the worms themselves.) All together, almost 20% of these late colonial prescriptions were for chemicals in the Paracelsian tradition.[16]

The four colonial physicians whose practices are summarized in Table 5 used all twenty-two drug classes in similar frequencies. Each had his own favorite drug within each class, presumably after making some kind of crude estimate of their relative efficacies, but we do not know just what kinds of data led to their respective choices. It has been said that protopharmacologic therapies were based on trial-and-error methods, but the daybooks of the four physicians provide no clues that any of them ever stopped using any drug, that any of them found an error in his practice. Only very rarely did any add a new drug to his practice.[17] The colonial physician probably did have clinical data that he could have used as positive controls, although he never used them as such, and he seems not to have recognized the potential utility of negative control data, or even that he might

---

16. J. Worth Estes, "Therapeutic Practice in Colonial New England," in Philip Cash, Eric H. Christianson, and J. Worth Estes, eds., *Medicine in Massachusetts, 1630-1800* (Boston: Colonial Society of Massachusetts, 1980), in press, Table XI.

17. Richard Harrison Shryock, *Medicine and Society in America: 1660-1860* (Ithaca, NY: Cornell University Press, 1960) 52; Estes, "Therapeutic Practice," see n. 14.

have any available to him. Shryock has suggested that the reasons for this oversight among eighteenth-century physicians include a widespread antipathy to quantitation, the relative scarcity of patients in the absence of large hospitals, and imprecise knowledge of pathology.[18]

There is, then, no evidence of conscious experimentation in the practice of the average colonial physician. His chief professional problems were the choice, first, of an appropriate drug class, and then of a specific drug within that class, for each patient.[19] The remedies that invariably provide relief from specific diseases were few. They included the Peruvian bark, an astringent used for intermittent fevers and, by extrapolation, for many other fevers; opium, a narcotic used for pain and for diarrhea; iron, an astringent, for chlorosis; and, after 1786, digitalis, variously regarded as a tonic or a sedative (a subclass of narcotics), for dropsy.[20]

The efficacies of all the other drugs among which the eighteenth-century physician might choose were seldom doubted or tested; hence there were no rules for making therapeutic choices. The drug classes that were employed most often, like cathartics, or even those used less frequently, like diaphoretics, might well have loosened a patient's bowels, or made him sweat, respectively, but whether such symptomatic therapy actually affected the course of his disease is moot. From today's point of vantage, it probably did not help very much if at all, although patient and physician thought that the drugs did provide effective therapy.

It is difficult to assess the actual accomplishments of protopharmacologic therapy in maintaining or restoring the health of our ancestors six generations removed, largely because we lack the necessary details about the outcome of treatment of non-fatal illnesses of the time. However, we can recognize that therapy that can be considered effective by today's standards was seldom possible, and that many colonial drugs were unpleasant in both their effects and their tastes, side effects that were satirized even in contemporary popular prints.

Why then, did patients continue to seek professional medical help, and why were patients so often satisfied with the treatment they received, over the long years during which protopharmacologic evidence, with all its now recognizable defects, was the only evidence available? We shall need data pertaining to diagnosis, treatment, and outcome in groups of patients with the same illnesses,

---

18. Richard H. Shryock, "The History of Quantification in Medical Science," *Isis* 52 (1961): 215-237.

19. See, e.g., William Heberden, *Commentaries on the History and Cure of Diseases* (1802; facs. repr. ed. New York: Hafner Publishing Co., 1962) 5-7.

20. Estes, "Therapeutic Practice," see n. 16; J. Worth Estes, *Hall Jackson and the Purple Foxglove: Medical Practice and Research in Revolutionary America, 1760-1820* (Hanover, NH: University Press of New England, 1979), in press, Chapter 5.

or symptoms, in order to answer these questions satisfactorily. The occasional assumption of a sort of mass placebo effect does not really explain very much, and the ineffective drugs were certainly not then recognized to be placebos.

Until better answers are available, we do find one clue in the records of the Philadelphia Dispensary for 1786-1792, summarized in Table 6. These records show that the overall death rate among adult patients was only about 5%, even among patients with the most prevalent illnesses, the infectious diseases. The death rate was highest among patients with diseases that are now know to affect the heart, and "cure" rates were lowest among the relatively infrequent diseases that were probably long-lasting chronic illnesses. In the absence of major epidemics, then, the infectious diseases seldom killed adults, even long before the

TABLE 6

Dispositions of 9683 adult patients treated at the Philadelphia Dispensary in 1786-1792, categorized by the organ systems thought by their physicians to have been affected.

The 438 fatalities tabulated died at the Dispensary; later deaths could not be identified. "Cure" rates are based on physicians' assessments at time of discharge from the Dispensary.

MODERN DISEASE CATEGORIES	Death Rate (%)	"Cure" Rate (%)	% of All Diagnoses	% of All Deaths
Cardiovascular	23.3	42.1	2.5	12.8
Central Nervous System	3.6	47.1	1.4	1.1
Genitourinary	2.0	63.3	0.5	0.2
Musculoskeletal	1.0	70.1	6.4	1.4
Female Reproductive Tract	0.0	82.8	2.9	0.0
Infectious	5.5	84.0	65.1	79.2
Eye, Head, and Neck	0.5	84.8	2.3	0.2
Gastrointestinal*	1.1	89.5	8.4	2.1
Accidents	0.7	91.9	5.6	0.9
Other	1.9	62.3	4.9	2.1
ALL PATIENTS	4.5	81.3	(100)	(100)

SOURCE: Samuel P. Griffits, J. Morris, John R. B. Rodgers, Caspar Wistar, Jun., William Clarkson, and Michael Leib, "Return of the Diseases of the Patients of the Philadelphia Dispensary," *Transactions of the College of Physicians of Philadelphia* 1 (1793) 2-42.

*Non-infectious gastrointestinal diseases.

appearance of antibiotics. It may well be that patients treated for the major non-epidemic diseases of colonial North America more often recovered than not, by about 19 to one, regardless of the treatments they received, and we know today that most of the drugs then available could not have been effective by today's criteria.

This hypothesis will require further testing, but it does seem that colonial patients had sufficient reason to have been satisfied with the drugs they were given in the ancient Galenic, protopharmacologic, tradition. Neither they nor their doctors could have known that a majority would have recovered without any of the 225 preparations then commonly available.[21]

Not until 1785 did the first small crack in humoral therapeutics appear, when William Withering published his book on the clinical efficacy of the foxglove in the treatment of dropsy. (Although the virtues of Peruvian bark had been discovered much earlier, its clinical applications were much less selectively focussed.) Withering's was the first large-scale prospective study of the beneficial and adverse effects of any drug in man, the result of a ten-year study by a physician who has been said to have had an aversion to numerical data. Although he may not have been interested in quantifying his results, he at least intuitively provided sufficient numerical data to permit our studying them today in ways that are standard in modern pharmacology. For instance, the doses with which he achieved therapeutic success, and the doses at which he saw evidence of toxicity, manifested as vomiting and visual disturbance, are about the same as those recognized to produce similar effects today. Figure 1 shows the data that led Withering to recognize that, among the different pharmaceutical preparations of digitalis which he used, the decoction was more toxic than either the dried leaf or the infusion, although all three were about equally effective. Consequently, he used these data to justify his abandoning the decoction in favor of the equally effective, but safer, leaf and infusion, the kind of clear decision that James Lind did not make after his one comparative trial. In addition, Withering did employ negative untreated (albeit historical) controls in evaluating the efficacy of the

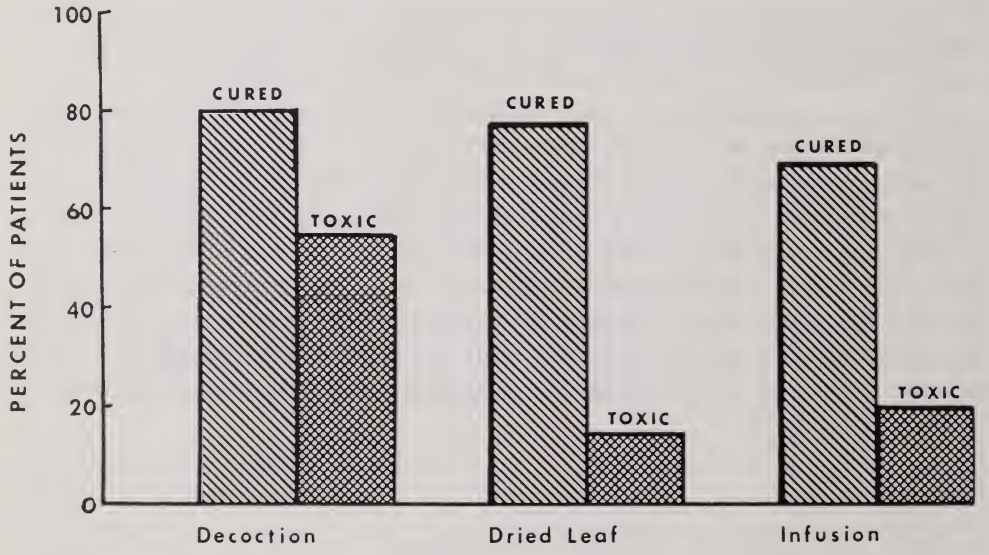
---

21. Rosenberg has argued very convincingly that, in the years around 1800, physicians and their patients shared a common concept of how the body worked, and that "Drugs reassured insofar as they acted and their efficacy was inevitably underwritten by the natural tendency toward recovery which characterized most ills." Charles E. Rosenberg, "The Therapeutic Revolution: Medicine, Meaning, and Social Change in Nineteenth-Century America," *Perspectives in Biology and Medicine* 20 (1977): 485-506. For a further elaboration of the recognition of self-limited disease, see: John Harley Warner, " 'The Nature-Trusting Heresy': American Physicians and the Concept of the Healing Power of Nature in the 1850's and 1860's," *Perspectives in American History* 11 (1977-78): 291-324.

new drug.[22]

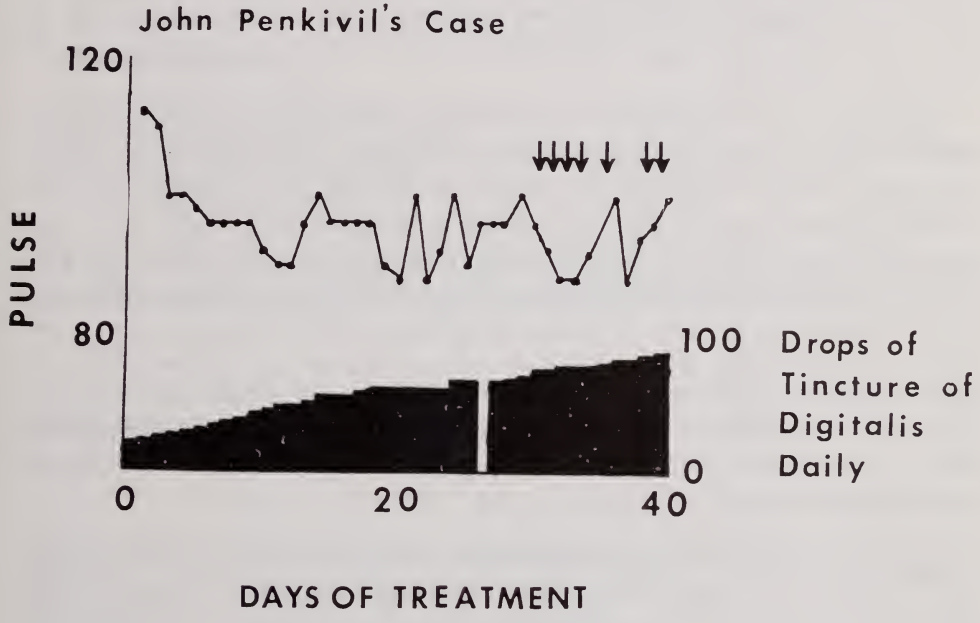
Withering's work stimulated others to study digitalis. In 1800 James Penkivil in England collected the data shown in Figure 2. Perhaps if he could have made a graph Penkivil would have learned more from his study. He did recognize that the drug lowered his patient's pulse rate over the first nine or ten days, but he continued to give digitalis in increasing doses, because apparently he did not see that he was only increasing the likelihood of toxicity over the last two weeks of the study, while failing to achieve any further slowing of the heart.

Figure 1. Rates of therapeutic success among William Withering's patients treated with three digitalis preparations (left-hand bars), and incidence of side effects among those patients (right-hand bars). SOURCE: William Withering, *An Account of the Foxglove* (Birmingham: M. Swinney, 1785), *passim.* (The figure is reprinted from: J. Worth Estes, *Hall Jackson and the Purple Foxglove* [Hanover, NH: Unversity Press of New England, 1979], in press, figure 3.)



22. Robert E. Schofield, *The Lunar Society of Birmingham* (Oxford: Clarendon Press, 1963) 125; Estes, *Hall Jackson*, see no. 20, Chapter 5. Similarly, experiments with tartar emetic in the 1780s were designed not to test its efficacy, but to evaluate different routes for its administration (John S. Haller, Jr., "The Use and Abuse of Tartar Emetic in the 19th-Century Materia Medica," *Bulletin of the History of Medicine* 49 (1975):235-257.

Figure 2. Daily dose of digitalis administered by John Penkivil in 1800 to a patient, and the patient's pulse and episodes of nausea and vomiting (indicated by arrows). SOURCE: John Penkivil, "On digitalis," *Medical and Physical Journal of London* 3 (1800): 315-321. (The figure is reprinted from: J. Worth Estes, *Hall Jackson and the Purple Foxglove* [Hanover, NH: University Press of New England, 1979], in press, figure 6.)



The probable reason for Penkivil's inability to exploit his data fully is that, like Withering, he considered digitalis a diuretic. Neither could have known that its site of primary action is the heart, and therefore, that the pulse might have been a reliable index of the magnitude of its effect (in the absence of the other kinds of data pertaining to digitalis effects that we know are necessary today). Still in the Galenic tradition, Withering and Penkivil seem to have reasoned that, because dropsy is characterized by edema, it represented a predominance of moisture in the body, and, therefore, it required treatment with a drying drug, a diuretic. The precise site of action of digitalis was not particularly relevant to eighteenth-century protopharmacology, of course. It was concerned more with efficacy and safety, and Withering's demonstration of these two essential facts was confirmed

repeatedly by others during the next thirty years.[23]

The inability of medicine to progress beyond its ancient protopharmacologic framework before Buchheim and Claude Bernard began to focus attention on the biological, rather than the supposed clinical, properties of drugs, and before today's statistical methods had been introduced into medicine, are exemplified in another way by Pierre Louis' study (1828) of the efficacy of bleeding. Louis divided a group of 77 patients with "pneumonitis" into two groups, those who survived and those who did not. All the patients had received the same treatment, bleeding; they differed only as to the day after the onset of their illness on which treatment was begun.[24] Table 7 shows that the number of bleedings was similar for each group, and that the mean duration of survival, or of symptoms, was the same for both groups.

Louis' study was not designed to test whether bleeding provided more or less effective therapy than any other mode of treatment, but whether the time of beginning therapy influenced the course of the disease. Chi-square analyses, utilizing different cut-off points for differentiating between "early" and "late" treatment, show that early bleeding was no more beneficial than late bleeding. In fact, the calculated values of chi-square are only very slightly less than they would have to have been for us to conclude the reverse, that late bleeding was more beneficial than early bleeding. Louis, of course, could not have known about chi-square, and it certainly seems unreasonable to suppose that late bleeding could have been more helpful than early bleeding. While 35% of his pneumonitis patients died, only about 7% of those at the Philadelphia Dispensary with the same diagnosis died.

Louis presented his data in two somewhat confusing tables. Figure 3 presents the same data in a manner that seems consistent with his intent. It shows that the survivors benefitted no more than those who died in terms of the duration of their symptoms, which is probably not surprising, because death effectively terminated the "experiment" in the subjects who died. Louis himself accepted the null hypothesis that he had tested because the variations within the two groups of patients were so large that he thought the groups could not be differentiated.

---

23. Estes, *Hall Jackson,* see n. 20, Table XXV and Figure 10.

24. [Pierre-Charles-Alexandre] Louis, "Recherches sur les effets de la saignée dans plusieurs maladies inflammatoires," *Archives Générales de Médecine* 18 (1828): 321-336. A recent translation of this first paper, with statistical comments, is in: W. J. Gaines and Herbert G. Langford, "Research on the Effect of Blood-Letting in Several Inflammatory Maladies," *Archives of Internal Medicine* 106 (1960): 571-579. For a very recent illustration of the inability of physicians in the pre-statistical protopharmacologic era to fully exploit data that were even then sufficient for modern kinds of data analyses, see: Steven J. Peitzman, "Richard Bright and Mercury as the Cause and Cure of Nephritis," *Bulletin of the History of Medicine* 52 (1978): 419-434.

TABLE 7

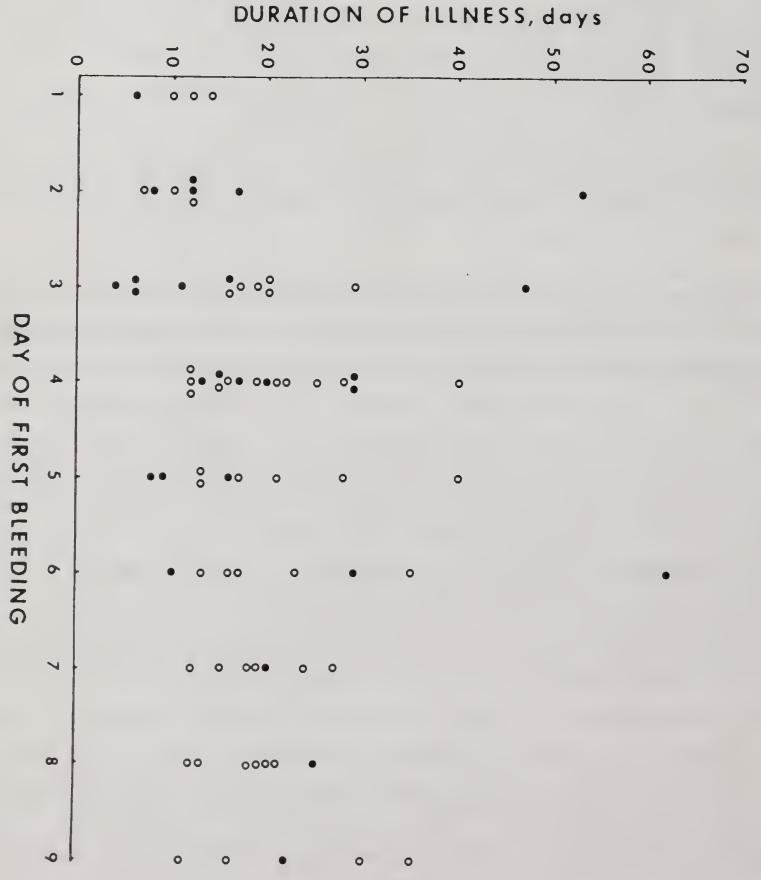
Summary of Pierre Louis' observations on the effect of bleeding on the course of pneumonitis.

	Survivors	Fatalities
Number of Patients	50	27
Mean Number of Bleedings	2.48	2.81
Duration of Illness, days, $\bar{x} \pm$ S.D.	19 ±8	19 ± 15
Duration of Illness, days *after* first bleeding, $\bar{x} \pm$ S.D.	14 ± 8	15 ± 14

SOURCE: [Pierre-Chalres-Alexandre] Louis, "Recherches sur les effets de la saignée dans plusieurs maladies inflammatoires," *Archives Générales de Médecine* 18 (1828): 321-336.

Yet, in spite of his data, and in the best protopharmacologic tradition, Pierre Louis continued to recommend bleeding as effective treatment for certain inflammatory disease because, he said, it should be able to restore to normal the imbalances produced by the pathologic processes that characterized inflamed lungs. Although his study was a pioneering statistical study in experimental therapeutics, it did not permit comparisons between positive and negative control groups — Louis did not demonstrate that bleeding was ineffective, nor did he try to — and it could produce little discernible change in therapeutic practice until, by mid-century, physicians had begun to understand the usefulness of the numerical method and of the new concepts of cellular pathology then appearing. In 1830 to 1833 Louis repeated his first study, but at another hospital (where 12% of his pneumonitis patients died). His new results were similar, but he did find that bleeding during the first four days of illness shortened its average duration (15 1/2 days) compared to bleeding on subsequent days (18 1/4 days). James Jackson, at the Massachusetts General Hospital (where 16% of patients with pneumonitis died in 1831 to 1834), was delighted to find that Louis' conclusions agreed with his own, that early bleeding reduced the convalescent

Figure 3. Scattergram showing the duration of illness among Pierre Louis' patients with pneumonia following initial bleeding. The 50 surviving patients are represented by open circles, and the 27 who died by closed circles. SOURCE: Pierre-Charles-Alexandre Louis, "Recherches sur les effets de la saignée," *Archives Générales de Médecine* 18 (1828): 321-336.



period from 14.6 to 11 days.[25]

The protopharmacologic tradition would survive until the methods used and demonstrated by Buchheim and his successors led to the pharmacology that is taught and utilized today, and until the introduction of biostatistics provided appropriate tools for making therapeutic decisions with definable degrees of probability. Most of the historical "landmarks" during the protopharmacologic period were not true turning points in the evolution of pharmacology; they often led to conclusions that cannot be reconciled with modern knowledge, or even with knowledge current at the time. Yet the problems faced by protopharmacologists are like those faced by today's pharmacologists: both must make logical decisions based on current standards of evidence.

Department of Pharmacology
and Experimental Therapeutics
Boston University School of Medicine
80 East Concord Street
Boston, Massachusetts 02118

---

25. P. Ch. A. Louis, *Researches on the Effects of Bloodletting . . .*, C. G. Putnam, trans. (Boston: Hilliard, Gray, & Co., 1836) 25-33. This edition contains an Appendix by James Jackson, in which see, especially, pp. 99-100 and 123-124. The overall death rate at the Massachusetts General Hospital, where Jackson worked, was 7.8% in 1824-34 (p. 100).

Actually, Louis' study was not the first statistical evaluation of the merits of bleeding. In 1806 Thomas Sutton, at the Military Hospital in Deal, England, reported that bleeding reduced mortality attributable to typhus from 30%, in cases treated by conventional methods, to only 5%, in cases treated primarily by bleeding. Seven years later, Thomas Wills, who had worked at the Dublin Fever Hospital, reported that copious bleeding reduced the overall mortality associated with fevers from 9%, among patients treated by regular methods, to about 4%, in two separate series of patients (Peter H. Niebyl, "The English Bloodletting Revolution, or Modern Medicine before 1850," *Bulletin of the History of Medicine* 51 [1977]: 464-483). Early bleeding was still advocated for anti-inflammatory prophylaxis in mid-century Edinburgh (Lester S. King, "The Blood-Letting Controversy: A Study in the Scientific Method," *Bulletin of the History of Medicine* 35 [1961]: 1-13). It is not generally remembered that bleeding survived well into the twentieth century; a member of my family recognized my fleam as the tool with which her mother was bled, for hypertension, in the 1920s. This relatively modern use of bleeding has been reviewed in: Guenter B. Risse, "The Renaissance of Bloodletting: A Chapter in Modern Therapeutics," *Journal of the History of Medicine and Allied Sciences* 34 (1979): 3-22.

William T. Bovie, Inventor and Teacher

WILLIAM K. BEATTY

WHEN a neurosurgeon thinks of an electrosurgical apparatus he will frequently think, "Ah, yes, a Bovie." If he is pressed to identify the person whose name was given to this useful tool he will probably say, "Oh, he was a neurosurgeon in New England somewhere." For this brief foray into recent history our neurosurgeon will receive a grade of 33 1/3% — Bovie did live in New England for more than 45 years. However, he accented his name on the second syllable and not, as the neurosurgeon would have done, on the first. Moreover, the typical neurosurgeon — even as long ago as World War I — probably did not qualify academically for his career by obtaining a Ph.D. degree in plant physiology.

William T. Bovie was born in Augusta, Michigan, on September 11, 1882. His father, also named William, had been born in New York, the descendant of a Huguenot family. The elder William had wanted to be a physician from his youth, but the road to medical practice was made difficult by poverty. For several years he labored on farms in upstate New York and then, after obtaining some education, he taught chemistry at an academy. When he had saved sufficient money, he entered the Medical and Surgical Department of the University of Michigan and was graduated in 1858. From Michigan the young doctor moved to Kansas, where he lived for a time as a cowboy. Returning to Michigan, Dr. Bovie set up his practice in Augusta and also purchased a farm; the latter was somewhat more lucrative than the former.

Young William, taking advantage of his early exposure to rural life and medicine, found information and challenges for his alert mind. Insects fascinated him, and long walks over the countryside soon enabled him to build up a substantial collection. William was also interested in fish and even had a pet trout that followed him wherever possible. With money earned from chores on neighboring farms he bought a camera and added photographs to his specimens and notes.

His father's career in medicine impressed on young William the importance of an education. Much of his early life was devoted to acquiring what little education he could, while doing farm chores, going on nature rambles, and saving money for college. The combination of rural practice and family farming did not give the father any excess of money for his son. Even if he had had the money, Dr. Bovie would not have set anything aside, since he believed strongly that everyone should pay for his own education.

The financial problem was solved when William spent his savings on living expenses in Kalamazoo and on tuition at the city's Parsons Business College.

There he learned stenography, which was to serve as a source of income in later years. From Kalamazoo he moved a few miles east of Battle Creek and enrolled at Albion College, where he spent three years. His alertness and relative maturity attracted the attention of Professor Charles E. Barr, who made Bovie his unofficial assistant. Bovie helped in the laboratory and in fieldwork; when Barr was ill he also gave lectures in biology, advanced zoology, and geology. Eventually the College appointed him assistant biologist. After completing his junior year Bovie transferred to the University of Michigan, where he earned his bachelor's degree the following year. Characteristically, he did not pick up his diploma until 1908, when he had saved enough money to pay for it.

After completing his work at Ann Arbor Bovie for a short time taught geology and biology at Antioch College. In the fall of 1908 he entered the University of Missouri, where he received the master's degree in botany in 1910. On September 15, 1909 he married a fellow-student, Miss Martha Adams of Kirksville, Missouri. Soon afterward the couple moved to Cambridge, Massachusetts, and Bovie began working toward his doctoral degree at Harvard. Bovie was now almost 30 years old and he impressed the other graduate students as being a member of an older generation. He soon became involved in important work on succesion in forest plants and on the storage of solar energy by plants.

It was at Harvard that Bovie began to develop as an inventor. His first paper, published in the *Botanical Gazette* for 1912, described a precision auxanometer which he had designed and built for his doctoral studies on the effects of ultraviolet light on plants. The earlier methods of measuring plant growth did not provide the precision that Bovie wanted. Two of his articles appeared in *Science* the following year. These papers, which briefly described his pioneer work on the coagulation of protein in ultraviolet light, have been cited for many years. In 1914 Bovie obtained the doctoral degree. His thesis was titled "The Action of Ultraviolet Light on Protoplasm." Bovie was then appointed a Research Fellow for the Cancer Commission at Harvard. He held this position for six years.

The Cancer Commission of Harvard University had been established by a bequest from Caroline Brewer Croft in June, 1899. The Commission had two representatives each from the establishing Fund, the Corporation, and the Medical School. Among the commissioners at the time Bovie was a fellow were such prominent medical men as J. Collins Warren, Henry P. Walcott, William T. Councilman, and Theobald Smith.

In 1911 Prof. George M. Reed, in a perceptive letter, wrote to Bovie, "You evidently have plenty of wheels to keep going and the making of apparatus and seeing it run seems to be one of your hobbies."[1] Bovie did indeed have many

1. Letter from George M. Reed to William T. Bovie, Nov. 29, 1911. Courtesy of the Western Historical Manuscripts Collection.

wheels going at Harvard. One was the development of a device for measuring the hydrogen-ion concentrations involved in his experiments with the effects of radiation on chemical solutions. He published a description of this direct-reading potentiometer in the *Journal of Medical Research* for 1915/16. Later, in correspondence on the subject with Charles B. Davenport at Cold Spring Harbor, Bovie sent a reprint of this article but cautioned Davenport against relying on the wiring diagram since it had been simplified to emphasize the basic points.[2]

The 1920s was the most productive period in Bovie's life. He pursued a variety of topics, developed several useful pieces of equipment, and made his major contributions to medical science. His articles appeared in a broad range of journals, including the *Botanical Gazette, Journal of Medical Research* (as many as five papers in one volume), *Journal of Biological Chemistry, Journal of General Physiology, Journal of Industrial and Engineering Chemistry, Journal of Urology, Harvey Lectures,* and the *Boston Medical and Surgical Journal.* The subjects included improvements in heat penetration during the canning process, the physiological effects of different dosages of radiation, and the sequential relation between sensitization to heat and short-wave radiation. For many years Bovie explored the effects of sunlight on the growth and development of plants, animals, and human beings. He was also interested in the screening power of window glass and other substances. In 1916, at the United Fruit Company Hospital in Santa Marta, Colombia, he tested the effects of ultraviolet rays on human blood serum and reported the results in the *Journal of Medical Research* (1918).

Bovie's fertile mind and obvious pedogogic ability brought him an assistant professorship in biophysics at Harvard in 1920. He held this post, one of the earliest academic appointments in the subject, until 1927. During 1920/21 he also had an instructorship in bacteriology.

Bovie's most productive work with radiation began when William Duane, who had worked with Marie Curie, arranged for a gram of radium bromide to be sent from France to the United States. Duane and Bovie began to investigate the effects of radiation produced by this material. They started on laboratory animals and gradually worked up to human patients. Since theirs was pioneering work, new apparatus was often needed. Because of his mental flexibility and mechanical dexterity Bovie proved extremely useful; he could often solve problems as they arose. He designed and made most of the equipment himself, much of it in the form of variously-shaped glass tubes and applicators. Much of this work took the form of cancer therapy and was done at the Huntington Hospital, where Bovie also collaborated with Dr. D. Crosby Greene.

2. Letter from Bovie to Charles B. Davenport, Mar. 6, 1918. Courtesty of the American Philosophical Society.

Few investigators at that time knew the danger of handling radium, and Bovie suffered as did so many others. However, he was more fortunate than many, and he ultimately lost only two phalanges from the fourth finger of his right hand. He suffered from the usual pains in his other fingers.

One day at the Huntington, while Greene and Bovie were working together, the overwhelming Harvey Cushing came over from the Brigham because he had heard about a new surgical device. Cushing immediately recognized the potential value of Bovie's electrosurgical "knife" and asked if it could be adapted for neurosurgery. Bovie felt that it could and was eager to move into a new field. At this time, the spring or early summer of 1926, Bovie had an undergraduate class at Cambridge, research students at the Medical School, and his work with Dr. Greene. The initial arrangement with Cushing was that the neurosurgeon would call Bovie whenever he had a suitable patient. In Bovie's words, "Dr. Cushing would call up and ask me to help operate. If I remonstrated that I was due to give a lecture to my class at Cambridge, he would ask, 'Which do you think the more important, your lecture or a patient's life?' Of course he won every time."[3]

Bovie had developed two devices for the cancer operations, each involving a high-frequency circuit. One was designed to cut tissue without causing hemorrhage (the "bloodless surgery" that later made such a hit with newspaper reporters); the second was used to coagulate vessels. A period of intense experimentation ensued, and a variety of loops, balls, and points that could be used with a sterilizable handle were developed by the time of the first surgical trial in a human patient on October 1, 1926. Cushing's surgical note tells what happened:

> This operation was a perfect circus — many ringed. The New England Surgical Association was here and almost every hand was occupied with them. I had persuaded Dr. Bovie to bring his electrosurgical unit over here to let me see what I could do with his cutting loop. This had necessitated re-electrifying the operating room. Dr. Greenough appeared with four or five coughing Frenchmen with colds in their heads, the student who was acting as possible donor fainted and fell off the seat. It was a little too much for Davidoff's successor [Cairns] who has been here only 2-3 days so that I finally had to call in Horrax. The patient, what is more, began to show marked falling off in r. b. c. and hemoglobin which had progressively dropped after his primary operation to this morning when his blood was only 2,800,000. In spite of all this, and more, things went surprisingly well... Under novacain a flap was this time turned down with base well in the temporal region so that the scalp could be entirely removed over the situation of the growth, something I should have done at the previous operation. On elevating the flap a large clot was disclosed which was removed by the sucker and a considerable amount of bleeding was started up afresh. I then roughly outlined the remaining extracranial crescent of tumor in the lower part of the field and in order to do so had to go through temporal muscle to get down to temporal bone. This was somewhat difficult.
>
> Then with Dr. Bovie's help I proceeded to take off most satisfactorily the remaining portion of tumor with practically none of the bleeding which was occasioned in the preceding

3. Fidus Achates (Mrs. Kenneth J. Hollinshead). Dr. William T. Bovie, 1905, Biophysicist and Inventor. *Io Triumphe* (Albion College), p. 99, Sept. 1948.

operation. The loop acted perfectly and blood stilling was almost complete but whether we would venture to use anything of this kind in the brain tissue itself I am at a loss to know for almost certainly it would cause convulsions.[4]

Cushing and Bovie spent several months after this with further experimental work, and eventually called in Mr. G. H. Liebel, President of the Liebel-Flarsheim Company of Cincinnati, to develop a commercial form of the apparatus. In order to make the device widely available, Bovie sold his patent for one dollar.

The neurosurgical-biophysical team progressed and tested the apparatus on patients with a variety of conditions. Cushing called back many of his patients in whom he had previously been compelled to desist because their meningiomas and hemangiomas had been inoperable. While the mortality rate increased — Cushing was now operating on conditions he would never even have approached earlier —the results were not only highly encouraging but in many cases dramatically so.

Later Bovie enjoyed telling particularly of two patients. The first was a professor at Michigan State College, who had been "a raving maniac." After the operation he recognized the members of his family and ultimately he was restored to his professional career. The other story was that of a woman who had lost her sight because of a brain tumor. The removal of the tumor restored her vision, and Lloyd Douglas, supposedly having heard Bovie tell this story during a lecture in Chicago, incorporated it in one of the dramatic scenes in his novel, *Magnificent Obsession.*

Cushing reported the results of his work with Bovie in the Macewen Lecture at Glasgow and in the *Lancet,* both in 1927. His major paper on the topic was printed in *Surgery, Gynecology and Obstetrics* in December, 1928, under the title, "Electro-Surgery as an Aid to the Removal of Intracranial Tumors. With a Preliminary Note on a New Surgical-Current Generator by W. T. Bovie, Ph.D., Chicago."

In 1928 Bovie received the award of which he was proudest. This was the John Scott Medal, presented by the City of Philadelphia. The medal and the accompanying $1,000 were given to him with fitting ceremony on December 6, 1928, at the annual banquet of the American Radiology Society.

The medal and premium had been named for their donor, John Scott, a chemist of Edinburgh. His bequest, given in 1816, had amounted to the sum of $4,000 in the form of the funded three percent debt of the United States. Little is known of Scott or his connection with Philadelphia, but the prestige of the American Philosophical Society and Scott's earlier friendship with Benjamin Franklin are probable links. According to Scott's bequest the award was to be "laid out in

4. John F. Fulton. *Harvey Cushing: A Biography* (Springfield, Illinois: Thomas, 1946) 537-538.

premiums to be distributed among ingenious men and women who make useful inventions . . . and along with which shall be given a copper medal with this inscription 'to the most deserving'."[5]

At the time of the Scott Award, Bovie was still an assistant professor of biophysics at Harvard, although he was also the Director of the Biophysical Laboratories of the Cancer Commission. However, when the opportunity arose to become chairman of a newly-created department of biophysics and a full professor Bovie accepted it eagerly. Dr. Irving S. Cutter, Dean of the Northwestern University Medical School, who had made the invitation, announced "Dr. Bovie had done more to show the application of physics to biology than any other man in America. Northwestern University is fortunate in obtaining his services."[6]

Dr. Bovie did some useful work in his new laboratory and developed a productive relation with Dr. Harry Mock, a leading Chicago surgeon, but he soon missed New England, which he had grown to love. The opportunity to return came in 1929, when a friend of his from the early days at the Cancer Commission,

Figure 1. Dr. Bovie in his private laboratory with an early microfilming apparatus. Courtesy of Albion College.

5. Courtesy of the Board of Directors of City Trusts, Philadelphia.

6. "Medical School Gets Dr. Bovie." *Northwestern Alumni News* (Dec. 1927) 7:4.

Dr. Clarence Cook Little, left the presidency of the University of Michigan to found the Jackson Memorial Laboratory in Bar Harbor, Maine. The Bovies (William, Martha — who was now an accomplished pianist — and their son, William Adams) set out for their new home in Salisbury Cove. Things did not work out as planned and Bovie set up a private laboratory in a garage next to his house. With the aid of wealthy friends he pursued various lines of research for the next ten years. These included early work on the microfilming of books and documents for preservation, and the formation of bibliographies by the same process (Fig. 1).

In 1939 the Bovies moved to Fairfield, Maine, where a large laboratory was erected on his property. Bovie not only pursued his personal research interests here but also, with an appointment as Lecturer in Social Technology at nearby Colby College, used the laboratory for some of his sessions with students.

Bovie retired from Colby in 1949 and devoted more of his time to his laboratory. He died on January 1, 1958, after a productive and varied life of 75 years. He had always been a fascinating and impulsive man, with an odd mixture of shyness and showmanship. He especially enjoyed demonstrating the dramatic effects of ultraviolet light on *Daphnia* and *Paramecium*. He also liked to use his electrosurgical apparatus to perform radical operations on a large beefsteak.

In later years he neglected his health and allowed himself to become overweight. Nevertheless his shock of white hair and his sparkling blue eyes gave him an attractive appearance, and he was well liked by individuals and groups. His alert creative mind and his exceptional mechanical dexterity have been beneficial to generations of patients, surgeons, students, and research workers.

Northwestern University Medical School
303 East Chicago Avenue
Chicago, Illinois 60611

The Siamese Twins of Santo Domingo

SAUL JARCHO

ON June 13, 1969, the *New York Times* printed a Reuters dispatch about Siamese twin boys who had been born to one Mercedes Rodríguez, a 15-year old woman in the village of Guayabo in the Dominican Republic. The twins were reported to be in good health and were expected to survive.

More than five years later, on September 19, 1974, the *Times* told of Clara and Alta Rodríguez, aged 13 months, Siamese twins, the daughters of Salvador and Farida Rodríguez of San José de Ocoa in the Dominican Republic. On the preceding day the twins had been separated during an eight-hour operation performed at the Children's Hospital of Philadelphia.

On September 20 a physician was said to have expressed apprehension as to the future psychological condition of the separated twins. In this report the operation was said to have lasted 10½ hours.

On September 22 the *Times* stated that the twins were given "a good chance for normal lives" after having undergone "more than 10 hours of surgery." Elsewhere in the same issue the *Times* published a photograph, credited to United Press International. This showed the Rodríguez twins; the caption stated that they were "doing well as they recover from the eight-hour operation... that separated them."

On November 2 the *Times* stated laconically that the twins had undergone supplementary corrective operations. On November 29 it reported that Altagracia and Clara had been formally baptized in the Roman Catholic Church. During the preceding summer the children had been given only conditional baptism, as they had not been expected to survive. The formal ceremony took place in the hospital chapel "with the 23 members of the surgical team that separated the twins as witnesses." On January 18, 1975, the *Times* published a photograph of the successfully separated twins at their home in the Dominican Republic. And on August 29, 1976, the *Times* reported that one of the twins had died in her native country. She had choked to death on a bean.

The Dominican Siamese twins of 1969 and those of 1974 are rarities, although none of the newspapers accounts that has come to hand has commented on the even greater rarity of two sets being born on the same island. But even these rarities have their precedent. The following passage is translated, with all its charming tautologies, repetitions, and intricacies, from the *Historia General y Natural de las Indias* by Gonzalo Fernández de Oviedo y Valdés (1478-1557), book VI, chapter XI.[1]

1. The translation is based on the fourteen-volume edition published in Asunción, Paraguay, in 1944-45 by Editorial Guaraní (vol. II, pp. 43 ff.). The original is dated at 1535-57. Different editions have variant titles.

Oviedo's Report

. . . it shall not be foreign to my theme and to the *Natural and General History of the Indies* to make mention of another monstrosity that was seen there [in Santo Domingo] at the time that I was writing these matters, since I saw it and it is a thing very notable and worthy of being known in the world, so that a work of nature which occurs very rarely should not remain in oblivion. Especially because, as to the new monstrosity that I describe here, those who saw it and those who may read of it must be happy to be assured that two souls went up to Heaven to occupy the places which were lost by Lucifer and his followers. Two girls who were born joined together, received the sacrament of baptism in conformity with the church and lived eight full days in this form, without ugliness or disgusting defects such as are usually apparent in human monsters, and they caused great wonder in those of us who saw them. Moreover, these girls were so well proportioned that each would have been a beautiful woman, alive, if they had not been joined together in this way.

Coming to the details of the case, I say that in this city of Santo Domingo in the island of Hispaniola, on Thursday night, July 10, 1533, Melchiora, the wife of Johan Lopez Ballestero, an inhabitant of this city, — both were natives of Seville — gave birth to two conjoined girls, one attached to the other, in the manner that I shall presently declare. I saw them the next day in the morning, together with the magistrate and some councillors and other principal persons and many of our townsmen, and other persons who were strangers sojourning in this city, and some religious and persons of knowledge. The mother being in bed and her husband being present, in the view of those whom I have mentioned these baby girls were unwrapped; and when they were naked I saw that from the navel upward they were stuck together by their chests up to a little in front of the nipples so that they had only one navel or umbilicus in common for the two. And from there upward their bodies were attached together as far as their stomachs or a little higher, but their nipples were separate, also their chests and everthing else from there on upward. Each had two arms, a neck, and a well-formed head, and a good face. And from the navel downward they were separate, each one by herself, but the joining was not straight but somewhat sidewise, as I shall state. When the children were unwrapped and the bandages were removed, both girls began to cry, and later when they were covered one was silent and the other continued for quite a while. The father said that as soon as they were born he had had them baptized and they had named one Johana and the other Melchiora; and after he had baptized one, the priest said, for safety's sake, when he baptized the other, "If you are not baptized, I baptize you." Because he did not know how to tell if they were two persons and souls or one...

Addendum. After this note was submitted for publication I found that my friend Dr. Fidelio Jiménez had written "The First Autopsy in the New World," *Bull. N.Y. Acad. Med.* 54 (1978): 618-619. Had these two essays been published simultaneously, they might have been regarded as twins — but not, I hope as monstrosities.

35 East 85th Street
New York, New York 10028

Gonorrhea

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333

CDC Recommended Treatment Schedules, 1978

Note: Physicians are cautioned to use no less than the recommended dosages of antibiotics.

UNCOMPLICATED GONOCOCCAL INFECTIONS IN MEN AND WOMEN

Drug Regimens of Choice

Aqueous procaine penicillin G (APPG) 4.8 million units injected intramuscularly at two sites, with 1.0 g of probenecid by mouth.

or

Tetracycline hydrochloride* 0.5 g by mouth 4 times a day for 5 days (total dosage 10.0 g). Other tetracyclines are not more effective than tetracycline hydrochloride. All tetracyclines are ineffective as a single-dose therapy.

---

*Food and some dairy products interfere with absorption. Oral forms of tetracycline should be given 1 hour before or 2 hours after meals.

These recommendations were established after deliberation with these therapy consultants:

Harold C. Neu, M.D., College of Physicians and Surgeons, Columbia University; Erwin H. Braff, M.D., San Francisco Department of Public Health; Gary Cunningham, M.D., Southwestern Medical School, Dallas; King K. Holmes, M.D., Ph.D., USPHS Hospital, Seattle; Franklyn Judson, M.D., Department of Health and Hospitals, Denver; William McCormack, M.D., State Laboratory Institute, Boston; Edwin M. Mears, Jr., M.D., New England Medical Center, Boston; John D. Nelson, M.D., Southwestern Medical School, Dallas; Morton Nelson, M.D., Orange County, California; Suzanne M. Sgroi, M.D., Suffield, Conn.; Frederick Sparling, M.D., School of Medicine, The University of North Carolina, Chapel Hill; Lt. Col. Edmund C. Tramont, Walter Reed Army Medical Center, Washington, D.C.

This material is published at the request of the Center for Disease Control as part of its program for wide distribution of this vital information.

or

Ampicillin 3.5 g, or amoxicillin 3.0 g, either with 1 g probenecid by mouth. Evidence shows that these regimens are slightly less effective than the other recommended regimens.

Patients who are allergic to the penicillins or probenecid should be treated with oral tetracycline as above. Patients who cannot tolerate tetracycline may be treated with spectinomycin hydrochloride 2.0 g in one intramuscular injection.

Special Considerations

— Single-dose treatment is preferred in patients who are unlikely to complete the multiple-dose tetracycline regimen.

— The APPG regimen is preferred in men with anorectal infection.

— Pharyngeal infection is difficult to treat; high failure rates have been reported with ampicillin and spectinomycin.

— Tetracycline treatment results in fewer cases of postgonococcal urethritis in men.

— Tetracycline may eliminate coexisting chlamydial infections in men and women.

— Patients with incubating syphilis (seronegative, without clinical signs of syphilis) are likely to be cured by all the above regimens except spectinomycin. All patients should have a serologic test for syphilis at the time of diagnosis.

— Patients with gonorrhea who also have syphilis or are established contacts to syphilis should be given additional treatment appropriate to the stage of syphilis.

Treatment of Sexual Partners

Men and women exposed to gonorrhea should be examined, cultured and treated at once with one of the regimens above.

Followup

Followup cultures should be obtained from the infected site(s) 3-7 days after completion of treatment. Cultures should be obtained from the anal canal of all women who have been treated for gonorrhea.

Treatment Failures

The patient who fails therapy with penicillin, ampicillin, amoxicillin, or tetracycline should be treated with 2.0 g of spectinomycin intramuscularly.

Most recurrent infections after treatment with the recommended schedules are due to *reinfection* and indicate a need for improved contact tracing and patient education. Since infection by penicillinase (β-lactamase)-producing *Neisseria gonorrhoeae* is a cause of treatment failure, posttreatment isolates should be tested for penicillinase production.

Not Recommended

Although long-acting forms of penicillin (such as benzathine penicillin G) are effective in syphilotherapy, they have NO place in the treatment of gonorrhea. Oral penicillin preparations such as penicillin V are not recommended for the treatment of gonococcal infection.

PENICILLINASE-PRODUCING *NEISSERIA GONORRHOEAE* (PPNG)

Patients with uncomplicated PPNG infections and their sexual contacts should receive spectinomycin 2.0 g intramuscularly in a single injection. Because gonococci are very rarely resistant to spectinomycin and reinfection is the most common cause of treatment failure, patients with positive cultures after spectinomycin therapy should be re-treated with the same dose.

A PPNG isolate that is resistant to spectinomycin may be treated with cefoxitin 2.0 g in a single intramuscular injection, with probenecid 1.0 g by mouth.

TREATMENT IN PREGNANCY

All pregnant women should have endocervical cultures for gonococci as an integral part of the prenatal care at the time of the first visit. A second culture late in the third trimester should be obtained from women at high risk for gonococcal infection.

Drug regimens of choice are APPG, ampicillin or amoxicillin, each with probenecid as described above.

Women who are allergic to penicillin or probenecid should be treated with spectinomycin.

Refer to the sections on acute salpingitis and disseminated gonococcal infections for the treatment of these conditions during pregnancy. Tetracycline should not be used in pregnant women because of potential toxic effects for mother and fetus.

ACUTE SALPINGITIS (PELVIC INFLAMMATORY DISEASE)

There are no reliable clinical criteria on which to distinguish gonococcal from nongonococcal salpingitis. Endocervical cultures for *N. gonorrhoeae* are essential. Therapy should be initiated immediately.

A. Hospitalization should be strongly considered in these situations:
   1. Uncertain diagnosis, in which surgical emergencies such as appendicitis and ectopic pregnancy must be excluded.
   2. Suspicion of pelvic abscess.
   3. Severely ill patients.
   4. Pregnancy.
   5. Inability of the patient to follow or tolerate an outpatient regimen.
   6. Failure to respond to outpatient therapy.

B. Antimicrobial Agents

Outpatients

Tetracycline* 0.5 g taken orally 4 times a day for 10 days. This regimen should not be used for pregnant patients.

or

APPG 4.8 million units intramuscularly ampicillin, 3.5 g or amoxicillin 3.0 g, each with probenecid 1.0 g. Either regimen is followed by ampicillin 0.5 g or amoxicillin 0.5 g orally 4 times a day for 10 days.

Hospitalized patients

Aqueous crystalline penicillin G 20 million units given intravenously each day until improvement occurs, followed by ampicillin 0.5 g orally 4 times a day to complete 10 days of therapy.

or

Tetracycline* 0.25 g given intravenously 4 times a day until improvement occurs, followed by 0.5 g orally 4 times a day to complete 10 days of therapy. This regimen should not be used for pregnant women. The dosage may have to be adjusted if renal function is depressed.

Since optimal therapy for hospitalized patients has not been established, other antibiotics in addition to penicillin are frequently used.

C. Special Considerations

— Failure of the patient to improve on the recommended regimens does not indicate the need for stepwise additional antibiotics but requires clinical reassessment.
— The intrauterine device is a risk factor for the development of pelvic inflammatory disease. The effect of removing an intrauterine device on the response of acute salpingitis to antimicrobial therapy and on the risk of recurrent salpingitis is unknown.
— Adequate treatment of women with acute salpingitis must include examination and appropriate treatment of their sex partners because of their high prevalence of nonsymptomatic urethral infection. Failure to treat sex partners is a major cause of recurrent gonococcal salpingitis.

— Followup of patients with acute salpingitis is essential during and after treatment. All patients should be recultured for *N. gonorrhoeae* after treatment.

ACUTE EPIDIDYMITIS

Acute epididymitis can be caused by *N. gonorrhoeae, Chlamydia* or other organisms. If gonococci are demonstrated by Gram stain or culture of urethral secretions, treatment should be:

APPG 4.8 million units, ampicillin 3.5 g or amoxicillin 3.0 g, each with probenecid 1.0 g. Either regimen is followed by ampicillin 0.5 g or amoxicillin 0.5 g orally 4 times a day for 10 days.

or

Tetracycline* 0.5 g orally 4 times a day for 10 days.

If gonococci are not demonstrated, the above tetracycline regimen should be used.

DISSEMINATED GONOCOCCAL INFECTION

A. Equally effective treatment schedules in the arthritis-dermatitis syndrome include:

Ampicillin 3.5 g or amoxicillin 3.0 g orally, each with probenecid 1.0 g, followed by ampicillin 0.5 g or amoxicillin 0.5 g 4 times a day orally for 7 days.

or

Tetracycline* 0.5 g orally 4 times a day for 7 days. Tetracycline should not be used for complicated gonococcal infection in pregnant women.

or

Spectinomycin 2.0 g intramuscularly twice a day for 3 days (treatment of choice for disseminated infections caused by PPNG).

or

Erythromycin 0.5 g orally 4 times a day for 7 days.

or

Aqueous crystalline penicillin G 10 million units intravenously per day until improvement occurs, followed by ampicillin 0.5 g 4 times a day to complete 7 days of antibiotic treatment.

B. Special Considerations
   - — Hospitalization is indicated in patients who may be unreliable, have uncertain diagnosis, or have purulent joint effusions or other complications.
   - — Open drainage of joints other than the hip is not indicated.
   - — Intra-articular injection of antibiotics is unnecessary.

C. Meningitis and endocarditis caused by the gonococcus require high-dose intravenous penicillin therapy. In penicillin-allergic patients with endocarditis, desensitization and administration of penicillin is indicated; chloramphenicol may be used in penicillin-allergic patients with meningitis.

GONOCOCCAL INFECTIONS IN PEDIATRIC PATIENTS

With gonococcal infections in children beyond the newborn period the possibility of sexual abuse must be considered. Genital, anal and pharyngeal cultures should be obtained from all patients before antibiotic

treatment. Appropriate cultures should be obtained from individuals who have had contact with the child.

PREVENTION OF GONOCOCCAL OPHTHALMIA

When required by State legislation or indicated by local epidemiologic considerations, effective and acceptable regimens for prophylaxis of neonatal gonococcal ophthalmia include:

Ophthalmic ointment or drops containing tetracycline or erythromycin.

or

One percent silver nitrate solution.

Special Considerations

— Bacitracin is not recommended.
— The value of irrigation after application of silver nitrate is unknown.

MANAGEMENT OF INFANTS BORN TO MOTHERS WITH GONOCOCCAL INFECTION

The infant born to a mother with gonorrhea is at high risk of infection and requires treatment with a single intravenous or intramuscular injection of aqueous crystalline penicillin G 50,000 units to full-term infants or 20,000 units to low-birth-weight infants. Topical prophylaxis for neonatal ophthalmia is not adequate treatment. Clinical illness requires additional treatment.

NEONATAL DISEASE

A. Gonococcal Ophthalmia: Patients should be hospitalized and isolated for 24 hours after initiation of treatment. Untreated gonococcal ophthalmia is highly contagious. Aqueous crystalline penicillin G 50,000 units/kg/day in 2 doses intravenously should be administered for 7 days. Saline irrigation of the eyes should be performed as needed. Topical antibiotic preparations alone are not sufficient or required when appropriate systemic antibiotic therapy is given.

B. Complicated Infection: Patients with arthritis and septicemia should be hospitalized and treated with aqueous crystalline penicillin G 75,000

to 100,000 units/kg/day intravenously in 2 or 3 divided doses for 7 days. Meningitis should be treated with aqueous crystalline penicillin G 100,000 units/kg/day, divided into 3 or 4 intravenous doses, and continued for at least 10 days.

CHILDHOOD DISEASE

Children who weigh 100 lbs. (45 kg) or more should receive adult regimens. Children who weigh less than 100 lbs. should be treated as follows:

Uncomplicated Disease

Uncomplicated vulvovaginitis, urethritis, proctitis or pharyngitis can be treated at one visit with:

Amoxicillin 50 mg/kg orally with probenecid 25 mg/kg (maximum 1.0g).

or

Aqueous procaine penicillin G 100,000 units/kg intramuscularly plus probenecid 25 mg/kg (maximum 1.0 g).

Special Considerations

— Topical and/or systemic estrogen therapy are of no benefit in vulvovaginitis.

— Long-acting penicillins, such as benzathine penicillin G, are not effective.

— All patients should have followup cultures and the source of infection should be identified, examined and treated.

Gonococcal Ophthalmia

Ophthalmia in children is treated as in neonates but the dose of penicillin is increased to 100,000 units/kg/day intravenously.

Complicated Infections

Patients with peritonitis or arthritis require hospitalization and treatment with aqueous crystalline penicillin G, 100,000 units/kg/day intravenously for 7 days. Aqueous crystalline penicillin G 250,000 units/kg/day

intravenously in 6 divided doses for at least 10 days is recommended for meningitis.

Allergy to Penicillins

Children who are allergic to penicillins should be treated with spectinomycin 40 mg/kg intramuscularly. Children older than 8 years may be treated with tetracycline 40 mg/kg/day orally in 4 divided doses for 5 days. For treatment of complicated disease, the alternative regimens recommended for adults may be used in appropriate pediatric dosages.

Department of Health, Education, and Welfare
Public Health Service
Center for Disease Control
Atlanta, Georgia 30333

Memoir of Donald L. Baxter
1927-1979

WILLIAM F. CHAVEAS

PEACEFULLY, in his own home, attended by his wife Emily, Donald Leslie Baxter, child of God and our brother in Christ, died at 1:30 in the afternoon of May 2, 1979." With these words, his Rector advised the congregation of his church of the passing of Donald L. Baxter, Sr., M.D.

The words were most appropriate as they typified the way Dr. Baxter lived his life — peacefully, quietly and yet most productively.

It began on May 4, 1927 in Washington, D.C., the son of Horace and Janet Baxter and a descendant of Gerardus Clarkson (1737-1790), one of the founders of the College of Physicians of Philadelphia. Upon graduation from the University of Richmond, he entered the Medical College of Virginia from which he received his medical degree in 1954.

Having the unique experience of serving in two of the armed services, Dr. Baxter followed two years of Army service before college with a career in the Navy Medical Corps after receiving his medical degree. At the time of his retirement from naval service in 1973, he held the rank of captain.

He served his internship at the U.S. Naval Hospital at Portsmouth, Virginia, and his residency at the U.S. Naval Hospital in Philadelphia. Additional studies were accomplished at the Navy School of Aviation Medicine, the Graduate School of Medicine at the University of Pennsylvania and the Armed Forces Institute of Pathology.

Having elected to specialize in dermatology early in his career, he was certified in that field in 1961 and was certified in dermatopathology in 1974. A scholar and academician as well as a clinician, Dr. Baxter was Associate Clinical Professor of Medicine (Dermatology) at Hahnemann Medical College and was a Consultant to the Surgeon General of the United States Navy.

A member and active participant in many professional associations, Dr. Baxter was President of the Philadelphia Dermatological Society. His other memberships included the American Academy of Dermatology, the Pennsylvania Academy of Dermatology, the Association of Military Dermatologists, the International Society of Tropical Dermatology and the American Society of Dermatopathology. His academic honors included membership in the Phi Beta Kappa, Omicron Delta Kappa and Alpha Omega Alpha. He published over 25 articles and presentations during his career.

Donald and Emily Hastings Baxter were married in 1951 and have two sons, Donald, Jr., and James, and a daughter, Janet Ghalib. Although subject to the

mobility of the naval service, the Baxters were fortunate to spend the greater part of their lives at stations that enabled them to live in the Delaware Valley. Long time residents of Moylan-Rose Valley with a short interval in La Jolla, California, while Dr. Baxter served at the San Diego Naval Hospital and in Vietnam, much of their lives centered around their activities at the Episcopal Church of the Redeemer in Springfield. Dr. Baxter was a vestryman of that parish for over six years and during the last years of his life served as Rector's Warden. He was an active fund raiser, having been chairman in 1963 of the committee which raised the funds necessary to complete the church's parish house.

Dr. Baxter's personal integrity and dignity were hallmarks of the man. Coupled with his quiet but productive manner, he was able to accomplish more with a few soft words than many can with volumes of rhetoric. His easy wit was a charming characteristic.

Although a Fellow of the College for only a few years, his active interest in the Section of Medical History was evidence of the significance he placed on his heritage as a direct descendant of Dr. Gerardus Clarkson. He will be missed.

Memoir of Wilbur Emory Burnett
1898-1979

GEORGE P. ROSEMOND, M.D.

WILBUR Emory Burnett, known to his numerous friends as "Mose", died January 11, 1979, at the age of 80. "Mose" Burnett, a pioneer in thoracic surgery and a highly respected and admired general surgeon, was Emeritus Chairman of the Department of Surgery at Temple University Health Sciences Center.

In 1944 the Temple University Medical School Year Book was dedicated to him with this preamble: "The scholar is measured by his mastery and honest interpretation of his subject. The surgeon is judged by the living results of the combined application of his knowledge, surgery and technical skill. The teacher is evaluated more subjectively; first, by his ability to impart a knowledge of his subject to his students; and second, by the degree to which he can inspire them to independent investigation."

"We of the class of 1944 dedicate this book to you, Dr. Burnett. You have combined well these attributes and in addition we are grateful for your friendship and honesty. Your influence will enrich our lives in medicine."

Having been an admiring student of "Mose" Burnett several years prior to 1944 and having been his associate in the practice of surgery at that time and for many years thereafter, I can attest to the unusual characteristics of this man who influenced the lives of so many of us. He gave generously of himself.

"Mose" Burnett was born February 20, 1898, in Spartanburg, South Carolina, a member of a large and close-knit family. His pre-medical education was received at Wofford College in Spartanburg where he excelled as an athlete and as a student. His medical education was temporarily interrupted by World War I. He received his M.D. degree from Jefferson Medical College in 1923. Internship followed at Joseph Price Hospital and Jefferson Medical School Hospital.

He then, as was customary at the time, took post graduate work in Vienna, Paris, London and Edinburgh.

Dr. Wm. N. Parkinson, later long-time Dean at Temple, but in 1926 Chief Surgeon for the Florida East Coast Railways, headquartered in St. Augustine, Florida, invited him to St. Augustine as Assistant Chief Surgeon. When Dr. Parkinson returned to Temple as Dean in 1929, Dr. Burnett succeeded him as Chief Surgeon. One year later, in 1930, Dr. Parkinson persuaded Dr. Burnett to join the Temple University surgical faculty. His highly successful career in the Philadelphia area was on its way.

Dr. Burnett was a member of numerous medical and surgical societies, among them the American Association of Thoracic Surgery, the County, State, and

American Medical Associations, the American Surgical Association, the International Society of Surgery and the American College of Surgeons (Vice President 1954-1955) and the Philadelphia Academy of Surgery, which he served as President for a two-year term (1960 and 1961). He was Chairman of the Surgical Department at Temple for 18 years. He was the author of many surgical papers, and surgical consultant to many hospitals in the Philadelphia area. He was a diplomate of the American Board of Surgery and the Board of Thoracic Surgery.

He was an ardent golfer and for years a competent and enthusiastic aviator.

Dr. Burnett was married to the late Peyton Bolling Jones in 1938. He is survived by a son, Livingston, of Norristown, Pennsylvania, and three sisters and one brother who reside in South Carolina.

Dr. Burnett will be remembered by those of us who knew and loved him for his great capacity for friendship, his surgical technique and surgical integrity, his generosity and his ability to transmit his considerable surgical knowledge to those of us fortunate enough to be listed among his students.

He lived a long and fruitful life, humbly accepting the rewards of his accomplishments and valiant in adversity. May his soul rest in peace.

The History of the Drug Treatment of Mental Diseases

ERWIN H. ACKERKNECHT

CHAUNCEY D. Leake (1896-1978), whom we honor today, is still so much with us that it seems unnecessary to present anew the details of his biography. But I should like to express my gratitude that I have been invited to give this lecture dedicated to him. In a professional and personal sense our ways crossed repeatedly, and I always respected him greatly. Dr. Leake started his professional career as a pharmacologist in 1913 in Madison, Wisconsin, and continued it triumphantly in San Francisco, Galveston, and Columbus. I came to Madison as a professor 25 years later. We saw each other frequently there and at national and international meetings, and we corresponded in the intervals. He was a man of many enthusiasms and was able to inspire many enthusiasms, but I feel justified in stating that foremost among his many interests were pharmacology and the history of medicine. He was productive in medical history from the time he issued his editions of Percival (1927) to his historical account of pharmacology in 1975.[1] I have therefore chosen for my lecture a subject which touches both of these disciplines.

We can discern four forms of treatment of mental diseases: magico-religous treatment, psychotherapy, pharmacotherapy, and physical treatment. It is of course artificial to separate them, since they are mostly combined in practice. Yet separation is possible because one form is usually dominant. This seems to me today true of drug treatment, at least as far as positive results are concerned. The use of psychoactive drugs is, of course, controversial. We hear that they are only symptomatic, that they are toxic, that the pharmaceutical industry makes unjustifiable profits, and that the drugs are prescribed too often. All this is true to a certain degree. But having worked in mental institutions 46 years ago, in the "pre-psychoactive drugs era," and thus being able to make comparisons, I still regard our present use of psychoactive drugs as constituting tremendous progress.

Drugs which supposedly helped people suffering from mental disease have been used at least since the time of Hippocrates, almost 2500 years ago. The Hippocratic writers (cf. vol. 10:628-630, ed. Littré) often praise the best known drug of this kind, by which supposedly Heracles was cured of insanity, i.e., hellebore. Unfortunately, at least two botanically and chemically different plants were known by this name in ancient Greece. The confusion continued, since in Latin both were called *veratrum* and in German both were called *Nieswurz*.

Third Chauncey D. Leake Lecture, University of California Medical School, May 23, 1979.

1.C.D. Leake, *An Historical Account of Pharmacology to the Twentieth Century* (Springfield, Ill., 1975).

These plants are *Helleborus niger* (black Hellebore) of the rose family Ranunculaceae, our Christmas rose, containing among other things a digitalis-like glycoside, and *Veratrum album* (white hellebore) of the family Liliaceae, containing among others the alkaloid veratrine. Both are strong emetics and purgatives, are very toxic, and can produce convulsions. Thus in some cases they might perhaps have had a shock-like effect.

The use of hellebore was by no means restricted to mental disease. Further, the drug was also applied to animals. Of later ancient medical authors, Celsus recommends white hellebore for depression and black hellebore for excitation. For sleep he advises the use of poppy, hyoscyamus, and mandragora.[2] Soranus, who in general is not favorably inclined toward potent drugs, nevertheless prescribes hellebore in insanity, and radishes as an emetic.[3] Aretaeus suggests black hellebore, thyme, the notorious panacea theriac, ivy juice, wormwood, and aloe.[4] The famous materia medica of Dioscorides discusses both black and white hellebore.[5] White hellebore (*Veratrum album*), purges and acts as an emmenagogue, abortifacient and mouse poison. Black hellebore (*Helleborus niger*) is a drastic and helps against epilepsy, melancholy, arthritis, paresis, fistula, deafness, skin diseases, leprosy, dropsy, and toothache. Like veratrum, it is an emmenagogue and abortifacient. It protects against evil spirits. While digging it one must pray to Apollo and Asclepius and eat garlic.[6]

After this passage in Dioscorides one can not help feeling skeptical towards herbals in general and towards that of Dioscorides in particular, even though it remains the best known and most imitated to this very day. If the claims that the herbals make are true, rabies, pulmonary tuberculosis, leprosy, baldness, malaria, diabetes, and other ailments should have disappeared at least 2000 yeats ago!

Dioscorides was probably convinced that hellebore could do all the things he mentioned. It should always be remembered that ineffective drugs can be easily credited wih positive results on the basis of simple "experience" because of the existence of self-limited diseases, placebo suggestion, and wrong diagnoses.

Hellebore was prescribed during the Middle Ages (by Constantinus and Rhazes), in the Renaissance (Gesner, Paracelsus, and Croll), in the seventeenth and eighteenth centuries (Wedel, Stahl, Vogel) and as recently as the 1830s

2. Celsus, *Corpus Medicorum Latinorum*, vol. 1 (Berlin, 1915) 122 ff.

3. Soranus, in *Caelius Aurelianus on Acute and Chronic Diseases* tr. J. E. Drabkin (Chicago, 1950) 535 ff.

4. Aretaeus, *Works*, tr. F. Adams (London, 1856) 301 ff, 473 ff.

5. Dioscorides, *De materia medica* tr. J. Goodyer, ed R.T. Gunther (Oxford, 1934) 4. 150.

6. *Ibid.*, 4. 151.

(Hauff, M. J. Schmid, Cazenave).[7] What a triumph of traditionalism! Pinel's opposition to hellebore was rather unusual. It is the prototype of the drug which is simultaneously a specific and a panacea.[8] The ancient materials presented above illustrate a tendency toward polypragmatism and a tendency toward polypharmacy which have plagued therapy to this very day.[9]

Hellebore demonstrates vividly the magico-religious background of ancient drugs. Its effects were supposedly discovered by the legendary Melampus, who cured the three insane daughters of King Proetus. It had to be collected under special ritual precautions, and its application was a ritual in itself. It chased evil spirits, as did such drugs as mandragora, periwinkle, and rue.[10]

When it was used rationally, it was usually regarded, because of its purgative and emetic properties, as the prototype of an evacuant in connection with the then prevailing humoral explanations of disease. When humoralism went into eclipse, hellebore and other purgatives (such as cassia and aloe) and other emetics remained in use, but the rationalizations for their use changed.

Next to evacuants, sedatives were much needed in cases of mental disease. Poppy, the seeds of which have been found in Swiss lakedweller sites, was recommended by Hippocrates and Celsus, but opposed by Soranus.[11] Dioscorides (IV. 65) recommends it for insomnia and in inflammations, cough, and fluxes. Other sedatives frequently recommended were the solanaceous herbs Mandragora (Aretaeus, Celsus), belladonna and hyoscyamus. Dioscorides (IV. 76) thought mandragora dangerous but recommended it in mania and as an anesthetic in surgical cases.

No essential changes in the general pharmacotherapeutic picture are noticeable util the 16th century. The same holds good for drugs used in mental diseases. Then an uninterrupted change and an increase began, caused by the spread of chemically prepared drugs, the importation of new and exotic drugs, especially from America to Europe, the revival of folk medicines, and eventually the appearance of synthetic drugs. In chronic diseases, in which patients live for many years usually all new drugs are tried, often with initial apparent success. Proksch reports more than 2000 drugs used in the course of history against syphilis; the insane have not escaped a similar fate.

The widespread use of chemically prepared drugs began with Paracelsus (1493-1541) and his followers. For use in mental disease he composed an arcanum called *athanor* or *Hungarian vitriol.* It contained oil of vitriol, camphor,

7. H. Haas, *Spiegel der Arznei* (Berlin, 1956) 71.

8. J. Starobinski, *Histoire du traitement de la melancholie*, (Basel, 1960) 17.

9. E.H. Ackerknecht, *Therapeutics* (New York, 1973) 146.

10. M. Grieve and C.F. Leyel, *A Modern Herbal*, 2 vols. (New York, 1959) 1: 388 ff.

11. Cf. note 3 *supra.*

skull, unicorn, herbs, roots, opium, mandragora, and hyoscyamus.[12] The use of metallic drugs also increased with Paracelus. Iron was tried as a tonic. Tonics now became an important group, next to evacuants and sedatives, in the treatment of mental disease. Mercury tended to replace hellebore. Benjamin Rush (1745-1813) still salivated his mental patients. Antimony, the favorite drug of Paracelsians, was very widely used, especially in the form of tartar emetic. The drugging of mental disease with emetics was still practiced by Esquirol and Heinroth in the nineteenth century.

Other sedatives of the period were perfumes and valerian; other tonics were women's milk and camphor.[13] In view of the panacea-like use of Peruvain bark, imported during the 17th century, its application in mental disease is not surprising. Burdach recommended it in 1809; Most recommended its alkaloid quinine in 1842.[14]

During the 18th century the revival of folk remedies brought about the use, in cases of mania, of digitalis (Cox 1750, Most 1842),[15] of *Dantura stramonium* and *Hyoscyamus niger* (Stoerck 1762), and of phosphorated codliver oil.[16] Perfect and Auenbrugger[17] reported good results with camphor, known since Avicenna. Was theirs also a kind of "shock treatment"?[18] Even cherry laurel (containing hydrocyanic acid) was tried.[19]

The progress of chemistry around 1800 led to the discovery and isolation of alkaloids, a momentous event in the history of pharmacology, allowing experimentation on a quantitative basis. In psychiatry the use of such alkaloids as morphine — instead of opium — and cocaine (the latter used in the treatment of morphine addiction!) did more harm than good.[20] This was less true of scopolamine.[21] The discovery of the halogens in the same period brought

---

12. Haas, (note 7), p. 81.

13. Starobinski (note 8), p. 45, 86.

14. E.H. Ackerknecht, "Aspects of the History of Therapeutics," *Bulletin of the History of Medicine* 35(1962):412.

15. *Ibid.*, 405.

16. Starobinski (note 8), p. 86.

17. J. Ducrét, *Auenbrugger als Psychiater* (Zurich, 1955).

18. Erna Lesky, "Auenbruggers Krampfkur," *Wiener Klin. Wschr.* 71(1959):289-93.

19. L.J. Spandaw du Cellieé, *De lauro-cerasi viribus venenatis ac medicatis* Diss., Groningen, 1797.

20. Ackerknecht (note 9), p. 110.

21. R. Kobert and A. Sohrt, "Ueber die Wirkung des Hyoscin," *Arch. Exp. Path. Pharm.* 22(1887):396.

potassium bromide into psychiatry (Behrend 1864, Glover 1842, Laycock 1857, Pavlov). Experimentation with so-called hallucinogens or psychodysleptics started with Moreau de Tours' work on hashish (1845) and that of the great Louis Lewin and Haffter on peytol (mescal) in 1889 and 1897.[22] The discovery of LSD by A. Hofmann (1943) added a most potent element to this group. The first clinical studies with LSD were made by Stoll in 1948. In the present context the hallucinogens are not essential, as I am dealing exclusively with treatment, in which the hallucinogens have proved to be unimportant. The same holds for the so-called stimulants, especially the amphetamines, which were discovered by Gordon Alles in 1933 in San Francisco, when he was looking for an improved replacement for ephedrine in the treatment of asthma.[23]

As a whole, increasing therapeutic skepticism during the eighteenth and early nineteenth centuries, supported by experiments and statistics, reduced somewhat the tendency to drug the insane and shifted emphasis from medicaments to management (Battie[24]) or moral treatment (Pinel).

Still the need for drugs, and especially for sedatives, was greater than ever before, after the beginnings of no restraint in 1839. Thus the search went on. Ether and chloroform anesthetics, known since 1846, were not usable, but in 1869 Oskar Liebreich, using a false theoretical assumption, derived from chloroform a very effective hypnotic, namely, chloral hydrate.[25] This, the first in a long series of somnifacients, is still used in psychiatry.[26] It was followed by paraldehyde (Cervello 1884), sulfonal (Baumann 1886), phenobarbital (Fischer 1903), and many others. Phenobarbital was first used successfully in epilepsy by Hauptmann in 1912. Other synthetic drugs appeared in the same time period, such as the antipyretics (salicylic acid, Buss 1875; antipyrine, Knorr 1844; antifebrin, Cahn-Hepp 1887; phenacetin, Hinsberg and Kant 1887).[27]

The hypnotics were purely symptomatic therapy, but they opened a new period in therapeutics, inasmuch as plant drugs now receded more and more, and the chemical industry replaced the pharmacist as the main producer of drugs. Barbiturate hypnotherapy, advocated by Klaesi in 1920 and by Cloetta in 1934, did not spread, and drug treatment did not become as important in psychiatric therapeutics as occupational therapy and psychotherapy. These were a logical

22. Bo Holmstedt, *Historical Survey in Ethnopharmacologic Search for Psychoactive Drugs* (Washington 1967) 3-33.

23. Leake (note 1), p. 34, 176: cf. Ayd (note 27), p. 76.

24.W. Battie, in R. Hunter and J. McAlpine, *300 years of Psychiatry* (London 1963) 407.

25. O. Liebreich, "Das Chloral," *Arch. Deutsch. Ges. Psychiat.* 16(1869):237.

26. J. Angst and Th. Dinkelkamp, *Somatische Therapie der Schizophrenie*, (Stuttgart 1974) 82.

27. Ackerknecht (note 9), p. 123.

outgrowth of the old moral treatment and developed late in the nineteenth century. Psychotherapy at that time meant suggestion and hypnosis (Bernheim, Forel, Mobius, Oscar Vogt) or rational psychotherapy (Dubois, Déjerine) or cathartic therapy (Janet, Breuer, Freud).[28] Physical methods regained interest after Wagner-Jauregg's successful malaria therapy of general paresis (1917). The 1930s brought insulin, Metrazol, and electric shock as well as psychosurgery. In the 1950s these controversial methods were largely replaced by the so-called psychopharmaka (psychopharmaceuticals).[29]

The word *psychopharmakon* is not new. In 1548 it was the title of a Frankfurt book of prayers for the dying. Kraepelin's *Pharmakopsychologie* (1892) is a close relative.[30] Macht discussed the new domain in a review article published in 1920 under the title *Contributions to Psychopharmacology*.[31] But the era of psychopharmacology really started in 1952, when psychiatrists heeded the advice of Laborit, a military surgeon, and used the "neuroplegic" chloropromazine, then called 4560 RP.[32] The first to follow suit were Laborit's colleagues at Val-de-Grace, Hamon, Parairé, and Vallaz.[33] Then came Delay and his group at Ste. Anne,[34] and within three years the rest of the world. The so-called psychiatric revolution had begun. Chlorpromazine is still the leading antipsychotic.[35]

Chlorpromazine grew out of the search for antihistaminics, started by Bovet (1937) and Halpern (1942). The sedative side-effects of antihistaminics were noticed rather early and widely. In 1950, Guiraud treated agitated psychiatric patients successfully with the antihistaminic promethazine, an

28. E.H. Ackerknecht, *Short History of Psychiatry* (New York, 1968) 85-95; L.B. Kalinowsky, in F.J. Ayd and B. Blackwell, *Discoveries in Biological Psychiatry* (Philadelphia, 1970).

29. Ackerknecht (note 28), p. 104-105.

30. E. Kraepelin, *Ueber die Beeinflussung einfacher psychischer Vorgange durch Arzneimittel* (Jena, 1892).

31. D. Macht, "Contributions to Psychopharmacology," *Bulletin of the Johns Hopkins Hospital*, 31 (1920): 167-173.

32. H. Laborit, P. Huguenard and R. Alluaume, "Un nouveau stabilisateur végetatif (le 4560 RP)," *Presse Med.* 60(1952):206-208.

33. Remarques sur l'action du 4560 RP sur l'agitation maniaque, *Ann. Medicopsych.* 110, I, (1952):331-35.

34. J. Delay, J. Deniker and J.M. Harl, "Utilisation en thérapeutique psychiatrique d'une phénothiazine d'action centrale élective (4560 RP)," *Ann. Médicopsych.* 110, II, (1952):112-117. As the name of Laborit is "forgotten" in this report, Anne E. Caldwell has devoted the better part of a very knowledgeable book, "Origins of Psychopharmacology. From CPZ to LSD," (Springfield, Ill., 1970) elucidating the true situation.

35. Angst (note 26), p. 26.

aminophenothiazine.[36] Phenothiazine, known since 1900, had been used as an antiseptic and as an anthelmintic,[37] and its derivatives as antihistaminics. Laborit, a surgeon, was in search of drugs which would potentiate anesthetics and would combat shock. He had been interested in the so-called undesirable side-effects of the antihistaminics, which would yield a potentiator of known anesthetics and would act as central autonomic stabilizers. In 1949, Charpentier of Specia fashioned for him the famous neuroplegic 4560 RP, released in 1951 as chlorpromazine or Largactil.[38] This drug was adopted successfully by the world's psychiatrists after Laborit had used it for hibernation anesthesia and "lytic cocktails."

A few years later another antipsychotic with a romantic past came to the foreground. This was reserpine, the alkaloid of the Indian plant *Rauwolfia serpentina*, a panacea mentioned in the sixteenth century by Garcia da Orta[39] and still called "insanity herb" by the Indian people. In 1933, Indian scientists had recommended rauwolfia[40] particularly to reduce hypertension and to produce sedation.[41] The principal alkaloid in rauwolfia was isolated by Müller, Schlittler, and Bein in 1952 and was first used in Great Britain and the United States in 1952 for its hypotensive effect. In 1954 it was introduced into Western psychiatry by Kline of New York and Weber of Zurich.[42] It proved less effective than chlorpromazine and even more prone to produce side effects, and is now used only rarely in psychiatry.[43] The plant product thus did not replace the synthetic drug.

The success of the neuroleptics, also called antipsychotics or major tranquilizers, has induced industry and scientists to search for more and better drugs. For reasons of space, the results can not be reviewed here. Perhaps there is no need for a review because in spite of variations and improvements no real breakthrough beyond chlorpromazine seems to have occurred, although dozens

36. P. Guiraud and C. David, "Traitement de l'agitation motrice par un antihistaminique (3277)," *Congr. Alien. Neurol. France* 48(1950):599 ff.

37. H. Hippius and O. Benkert, *Psychiatrische Pharmakotherapie* (Berlin, 1974) 72.

38. P. Charpentier, et al, *C.R. Acad. Sci.* (1952):235-59.

39. Garcia Da Orta, *Colloquios dos simples e drogas da India* (Goa, 1564) [Engl. tr. London, 1913].

40. R.N. Chopra and J.C. Gupta, "Pharmacological action of alkaloid of Rauwolfin serp." *Ind. J. Med. Res.* 21(1933):261.

41. B.B. Bhatia, *J. Ind. Med. Assoc.* 11(1942):262; J. C. Gupta and A.K. Deb, *Ind. Med. Gaz.* 78(1943):547.

42. E. Weber, "Ein Rauwolfialkaloid in der Psychiatrie," *Schweiz. Med. Wschr.* 84(1954):168; N.S. Kline, "Use of Rauwolfia serp. in neuropsychiatry," *Ann. New York Acad. Sci.* 59(1954):107.

43. Angst (note 26), 24; Hippius (note 37), p. 158.

of phenothiazines and other drugs are now on the market. In 1958, by means of animal experiments, Janssen showed the butyrophenones[44] to be equally interesting substances. One of them, haloperidol, is now used very widely in Europe. In view of the difficulties experienced in assuring regular intake of oral medications by ambulant psychotic patients, the development of long-acting injectable depot forms of neuroleptics also represents a considerable step forward.

In 1957, when Roland Kuhn of Muensterlingen published his results with impramine (Tofranil) and iminodibenzyl,[45] a second important group of psychopharmaceuticals, the antidepressants or thymoleptics, was introduced. In 1950 Kuhn had tested for Geigy a benzazepine antihistaminic for sedative effects in patients. Not obtaining satisfactory evidence, he had stopped further testing. In 1954, impressed by the success of chlorpromazine, he went back to testing and discovered the thymoleptic effect of impramine in depression. A number of impramine-like drugs have been developed since then.

In 1957 Kline, already mentioned as a pioneer in the use of reserpine, announced together with Loomer and Saunders, the antidepressant effect of the monoamine oxidase inhibitor iproniazid.[46] Iproniazid had originally been used in the treatment of tuberculosis. For a while the monoamine oxidase inhibitors were much used as antidepressants, but because of their toxicity they have now been largely abandoned, except for tranylcypromine. They have been the stimulus for numerous hypotheses concerning the biochemistry of psychoses, since they influence the important cerebral monoamines norepinephrine, dopamine, and serotonin. Since the latter contains an indole ring system, it can be considered to be related to lysergic acid diethylamide and reserpine.[47]

An important addition to the antidepressant armamentarium is lithium. In 1949, in an accidental experimental observation, J.F.J. Cade of Australia discovered the antimanic effects of lithium salts and then confirmed them clinically.[48] Not many followed him at that time, as lithium (discovered by Arvedson in 1817 and isolated by Matthiessen in 1855) had acquired the reputation of being very toxic when used in gout or as a substitute for sodium chloride. Furthermore, chlorpromazine had just appeared. The situation changed

---

44. P.A.J. Jansson, "The Buturophenone Story," in Ayd (note 27), pp. 165-179.

45. R. Kuhn, "Ueber die Behandlung depressiver Zustande mit einem Iminodibenzylderivat," *Schweiz. Med. Wschr.* 87(1957):1135.

46. H.P. Loomer, N.S. Kline and J.C. Saunders, "Evaluation of Isoniazid as psychic energizer," *Psych. Res. Pub. Am. Psych. Assoc.* 8(1957):129.

47. Hippius (note 37), p. 18-25; W. Poldinger, *Compendium der Psychopharmakotherapie* (Basel, 1967) 90.

48. J.F.J. Cade, *Med. J. Australia* 36(1949):349.

in 1954 after the report of Schou,[49] and especially after 1960, when the unique prophylactic role of lithium in manic-depressive psychoses was described by Hartigan and Baastrup.

The first tranquilizers (or minor tranquilizers as they were called after the appearance of the antipsychotics or neuroleptics) were muscle relaxants like meprobamate with sedative side effects.[50] Most of those used now are benzodiazepines. Both major and minor tranquilizers sedate, but there are two very important differences: minor tranquilizers, mostly given to neurotics, have no antipsychotic effects, and the minor tranquilizers are addictive, the major are not.[51] Minor tranquilizers are less dramatic in their effects, but are likewise important clinically. In this field again a great number of preparations with different names but similar effects crowd the market. Minor tranquilizers are also used in epilepsy.[52] Tetraethylthiuram disulfide (disulfiram, Antabuse), an antioxidant formerly used in the rubber industry, was introduced into the treatment of chronic alcoholism by Jensen and Martensen-Larsen in 1948. It is an improved version of the old aversion therapy in which emetics were used.

All psychopharmaceuticals, like all potent drugs, have side-effects, that is, they may be toxic. Minor tranquilizers may affect the ability to react, and produce ataxia. Neuroleptics produce extrapyramidal motor symptoms, especially dyskinesias and Parkinsonism. While Parkinsonian symptoms produced by neuroleptics can be treated with the older antiparkinsonian drugs, i.e., anticholinergics such as trihexyphenidyl or biperiden, which have replaced the older alkaloids, the newer dopaminergic drugs such as levodopa seem contraindicated. Eye changes are rare; hypersensitivity reactions are more common and may be dangerous. Antidepressants affect the heart via the autonomic nervous system, and may affect cardiac rhythm and blood pressure.[53]

A second great problem arising out of the all-too-great number of psychopharmaceuticals and as an additional handicap involves not their pharmacological but their trade names. The physicians are subjected to such a barrage of mail advertising, journal advertising, and visits of detail men,[54] it is not certain that the most appropriate drug is prescribed. One also can not help feeling that these drugs might be used and prescribed too often and without proper diagnosis. This also applies to many other drugs, such as the antibiotics.

---

49. M. Schou, et al, *J. Neurol. Neurosurg. Psychiatry* 17(1954):250.

50. F.M. Berger, "The pharmacological properties of 2-methyl-2-*n*-propyl-1,3-propanediol dicarbamate (Miltown), a new international blocking agent," *J. Pharmacol. Exp. Ther.* 112(1954):413-423.

51. Hippius (note 37), p. 165.

52. *Ibid.*, 173.

53. *Ibid.*, 97, 33.

54. G. Baehr, in P. Talaley ed., *Drugs in our society* (Baltimore, 1964) 181.

In spite of these negative aspects I must return to my initial statement that the psychopharmaceuticals have brought about a great change for the better. Even fashionable new therapies like social therapy, group therapy, or behavior therapy would often be impossible without them. There are, of course, those who are confident that mental disease is produced by social conditions. For them, pills are only a ridiculous and disgusting attempt to avoid the real task of decreeing a new society. I admire their omniscience, but even if it were proved that society is the cause of mental disease, I still think that doctors are born and trained to help sick people, not to reconstruct society.

Forty years ago, when the whole field of infectious diseases became completely transformed through new drugs, the hope was very small that something similar could happen in the field of mental disease. And yet twenty-five years ago genuine inprovements became possible through new drugs. I have not hidden their shortcomings, but I do feel entitled to hope that one day my whole lecture, not only its first part, can be rebaptised "the prehistory of drug treatment of mental disease."[55]

42 Ottikerstrasse
Zürch, Switzerland

55. I am most grateful to Prof. H. H. Walser for critical reading of my manuscript, and to Prof. J. Angst and Prof. M. Bickel for valuable references.

The History of the Brompton Hospital

P. J. BISHOP

THE circumstances which led to the foundation of the Hospital for Consumption and Diseases of the Chest, as the Brompton was first known, are of great interest and serve as a reminder of how much may be accomplished through the vision, enthusiasm, and dedication of one man. In 1841, Philip Rose, a young London solicitor, had a consumptive clerk in his employ. This unfortunate man had failed to gain admission to any hospital, as at that time the rules of all general hospitals in London, and indeed elsewhere, formally excluded such cases. This was not so much because the authorities feared the infectious or contagious nature of the disease, although this had been suspected since classical antiquity, but rather because of the unhappy outcome all too often expected and simply because it was not thought worthwhile devoting a charity bed to such a lost cause. At this time the population of England numbered about fifteen million, of whom nearly two million were herded into London, largely as a result of the exodus from the country, brought about by the Industrial Revolution. The mortality from pulmonary tuberculosis, then often called phthisis, or consumption, was about 60,000 to 70,000 a year, and the average expectation of life for a workman was perhaps as low as seventeen years.

A good idea of how many people lived at the time can be gathered from the writings of Dickens, Kingsley, Engels, Playfair, and others. It was the age of the 'sanitary idea,' and the work of various Royal Commissions, the field studies of Sir John Simon and his collaborators, and the writings of such men as Edwin Chadwick, had shown by detailed statistical analysis something of the true extent of the great medico-social problems, and had indicated both what could be done and what should be done to remove or alleviate the worst effects. Ideas about the true nature of tuberculosis were still hazy. Although Laennec, by his brilliant clinical and pathological observations, had established the essential unity of the disease, notions were still confused. It was not until the 1860s that Villemin was to demonstrate the specificity and inoculability of tubercle, and not until 1882 that Koch was to discover the tubercle bacillus and to show by his meticulous work that it was the true causative agent. Knowledge of bacteriology, radiology, clinical pathology, and of course any effective treatment were all in the future.

However, the great importance of tuberculosis as a cause of death and untold suffering was well known, and the sections on prognosis in standard works of the day bore witness to the gloomy outcome which faced many consumptives.

Philip Rose, dismayed and concerned by the experience of his clerk, and activated by the melioristic spirit that we find in so many of our Victorian ancestors, lost no time in interesting various influential people in the matter. At

this stage Rose was not an influential figure, merely a young solicitor busily engaged in establishing himself in his profession, and in bringing up his family. Probably the first of his medical contacts was his brother-in-law Dr. William Harcourt Ranking. In Janurary, 1841, he informed Rose that he had drawn up a prospectus. This well-thought out document described the great need for a special hospital for consumptives and spoke of the good which might be expected to come from it. On the 4th of March a meeting held at Rose's house was attended by eight persons, who formed the first, informal Committee. They concluded that rather than try to influence the authorities to change their minds on their policy of not admitting consumptives, it would be best to try to found a special hospital. So began the task of writing eminent medical men and influential laymen and enlisting their support. Some of those approached, such as Sir Henry Halford, physician and confidante of members of the Royal Family, doubted the wisdom of such a venture and pointed out that consumptives, unlike certain other categories of patient, had never been grouped together, and that doubtless there were good reasons for this. One of those canvassed for support was that great humanitarian, Lord Shaftesbury, but he expressed the regret that his many commitments prevented him from taking any active part. Nevertheless, many people did express interest or offer financial assistance. By the 25th of May, Rose and his collaborators were ready to bring the matter before the public. A meeting held at the Hanover Square Rooms was attended by many eminent medical men and laymen. Dr. C.J.B. Williams spoke of the ravages of consumption, especially among the poor, and reminded the audience that while many special categories were catered for, consumptives, among whom the disease wrought such a high mortality and morbidity, were relatively unprotected. Williams forcefully attacked critics who had spoken of a special hospital for consumptives as a house of death or a vestibule of the tomb, and had asked who would ever want to enter such a place. Williams said that many patients would gladly come, buoyed up by the optimism which was such a well-known feature of the disease, even in hopeless cases. At the end of the meeting it was resolved to found a special hospital for consumption and other chest diseases.

At this time at least two other institutions catered in some way for consumptives; one was the Royal Chest Hospital in the City Road. This had been founded by Isaac Buxton in 1814 as the Infirmary for Asthma, Consumption, and other Diseases of the Chest. By the 1840s it apparently functioned only in a small way, as an out-patient dispensary. There was also an interesting venture known as the West London Dispensary for Diseases of the Chest, at Wells Street, which dealt with out-patients only. At this time, specialists, specialisation, and special publications were often regarded with suspicion by the arbiters of medicine. Bodington's little essay on consumption, based on his experiences in treating the disease in a closed establishment under personal supervision, was one of the publications which came in for a severe mauling by the medical press of the day.

Bodington's work has been highly regarded by historians of tuberculosis, who speak of his pioneer attempt at sanatorium treatment, but there is no doubt that works which used the words 'successful cure' on their title-pages often aroused antagonism, particularly when employed in such serious diseases as consumption.

We know very little about the West London Dispensary, except for what we can learn from its published prospectus. It appears to have been a worthy institution, with some good men on its staff; and we know that it had the hope of developing into an institution that could receive in-patients. However, when its supporters heard of Rose's plans, they discontinued their activities and generously recommended that allegiance be transferred to Rose's venture, which planned to cater to in-patients.

The next step was the securing of suitable premises. In September, 1842, the Committee leased a building known as the Manor House, which stood near the famous old Royal Hospital at Chelsea, and this was adapted to accomodate twenty patients (Figure 1). Here the great adventure started. The Hospital was to be divided into two parts, the Hospital and Asylum at the Manor House, where in-patients were received and out-patients could attend twice a week, and an out-patient branch and office at 20, Great Marlborough Street, which functioned four

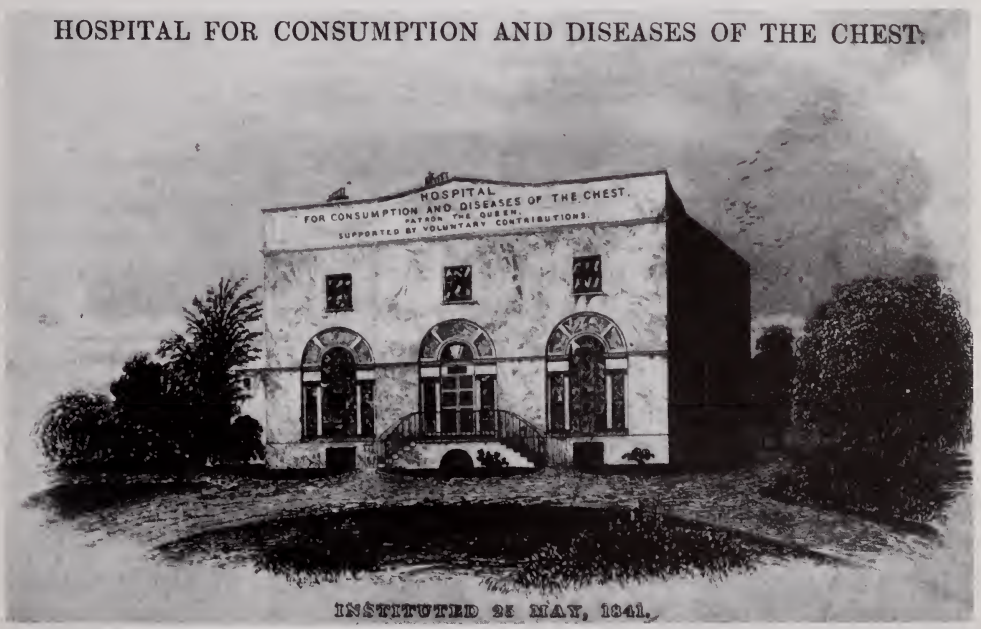

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST.
HOSPITAL
FOR CONSUMPTION AND DISEASES OF THE CHEST.
PATRON THE QUEEN.
SUPPORTED BY VOLUNTARY CONTRIBUTIONS.
INSTITUTED 25 MAY, 1841.

Figure 1. The old Manor House at Chelsea — the first home of the Hospital.

days a week as a dispensary. The dispensary and office opened in March, 1842, and the Manor House in September. Admission was to be by the then usual method of governors and subscribers giving tickets to prospective patients. The Medical Staff was to consist of two consulting physicians, two physicians-in-ordinary, one visiting physician, a matron (who also acted as housekeeper), and some nurses. The first two consulting physicians were both eminent men. Charles James Blasius Williams had been a pupil of the great Laennec in Paris in 1825-26. John (later Sir John) Forbes had produced in 1821 the first edition of his English translation of Laennec's immortal *De l'Auscultation Médiate,* the cornerstone of modern studies of chest diseases, and the work which introduced the stethoscope into medicine. Forbes produced no less than four editions of his translation, or rather version, betwen 1821 and 1834, and had probably done as much as anyone to make this exciting and stimulating work known and available to the medical profession. The two physicians were George Hamilton Roe and Walter Hayle Walshe, the latter the author of a work on chest diseases which became the standard text of the day. Theophilus Thompson was the first visiting physician. He made home visits to patients too ill to attend either the hospital or the dispensary.

By May, 1843, arrangements had been made for the admission of pupils to the wards of the hospital and for the delivery of lectures on diseases of the chest. This was in accordance with the intentions of the founders, who were aware from the very first of the part that such an institution should play in teaching and research. From the beginning there was a great demand for admission, and by May, 1843, it was already proving necessary to enlarge the Manor House by the addition of a wing to accommodate fifty additional patients. In the first six months 63 patients had been admitted, while the Out-Patient Branch at Great Marlborough Street had treated 746 patients. Although the Committee of Management, on leasing the Manor House, had mentioned that it was capable of enlargement, this proved impracticable. They therefore turned their attention to the construction of a brand new building specially designed for consumptives. An appeal was launched and the patronage of Queen Victoria and other influential figures was secured.

After much discussion they chose a site at Brompton, then a village near Kensington, itself still a village. This part of London was very rural in the 1840s and had for long been regarded as especially salubrious. It consisted in the main of market gardens, said to have been the first in the country. It had a few houses, mostly the homes of artists, actors, singers, and musicians.

The foundation-stone of the hospital was laid by Albert, the Prince-Consort, who arrived on horseback from Buckingham Palace on the 11th of June, 1844. After the ceremony a grand bazaar was held in the grounds of the Royal Hospital at Chelsea. It lasted two days and was attended by more than 10,000 persons on the first day alone. This bazaar had the usual stalls, run by lady-supporters of the venture, and several poems were on sale, written specially for the occasion. Some

of these were what we would now call real 'tear-jerkers,' but our Victorian ancestors had few inhibitions about showing their often deep and sincere feelings on such matters, either in prose or in verse. In fact, this promotional literature was very well calculated to appeal to the feelings, philanthropic inclinations, and social conscience of the public. The early committee excelled at public relations, and many of the appeals and other documents that they issued drew attention to the fact that consumption brought great misery to the poor, by adding economic distress to the burden of their physical condition, but the rich were not spared. The west wing and part of the center of the Hospital were completed by the spring of 1846. By May of that year 272 in-patients had been admitted since the opening of the Manor House, and 4,893 out-patients had been seen and treated. The wards of the new hospital were divided into small rooms, a remarkable anticipation of modern developments, and were ventilated by a novel system of forced warm air. This was a deliberate attempt to produce a temperature approaching that of the southern latitudes; this was thought highly beneficial in consumption but was beyond the reach of all but the wealthy. From contemporary records it is abundantly clear that the founders of the Brompton were well aware of the debt they owed their less fortunate brothers and sisters, and realised that they themselves were in some measure responsible for tolerating the appalling conditions in which so many persons lived and worked.

It is worthwhile to consider here the extraordinary progress the venture had made up to that time. The idea had been conceived in 1841. Between that time and 1846 a hospital had been adapted from the Manor House and patients had been admitted, an out-patients' branch and dispensary had been established, and the great decision had been made to proceed with the plan of a new hospital, specially designed. All this had been accomplished despite much opposition or indifference, but obviously much support and encouragement, both financial and other, had been forthcoming.

By November, 1846, 60 beds were in use at the Brompton, and it was found necessary to appoint two clinical assistants, or housemen as we would call them now, to assist the two physicians and to keep statistical and pathological records. Some assistant-physicians were also appointed, and Richard Payne Cotton, George Cursham, and Richard (later Sir Richard) Quain joined the staff. In July, 1848, the singer Jenny Lind, known as the Swedish Nightingale, gave a concert in aid of the building fund and raised a substantial amount, which enabled completion of the hospital by the addition of the east wing in 1854. This increased the number of beds to 220. A gallery of wards was named after her and commemorates our link with this talented and philanthropic figure. Between September, 1842 and December, 1848, 888 in-patients and 10,051 out-patients had been treated. Finances were a constant source of concern, as the growing reputation of the hospital attracted more and more patients, as C.J.B. Williams had predicted. At this time, and indeed for long afterwards, the Brompton was

entirely dependent on donations received from various benefactors. Some were regular annual subscribers while others gave varying amounts at different times. Much of the money was collected in relatively small contributions on an almost door-to-door basis. Philip Rose toured the provinces, and set up provincial associations, which also collected money.

It can be said that the Hospital was a success from the very first, although in using the word success one knows that for many patients, especially those in the last stages of consumption, little enough could be done. The Committee was frequently concerned that governors and subscribers were giving tickets of admission to many whose condition was hopeless. But even in these hopeless cases the Hospital was already proving of inestimable benefit. Although the medical staff lacked effective anti-tuberculosis drugs, the Hospital could at least provide shelter and comfort, and could alleviate the sufferings of many doomed patients.

In 1849 the Brompton published its First Medical Report, an important document, which reported and analysed in great detail 4,358 cases of consumption, almost certainly the largest series studied and reported up to that date (Figure 2). The report shows that the Brompton physicians had investigated most factors which were then thought to be important or significant in the

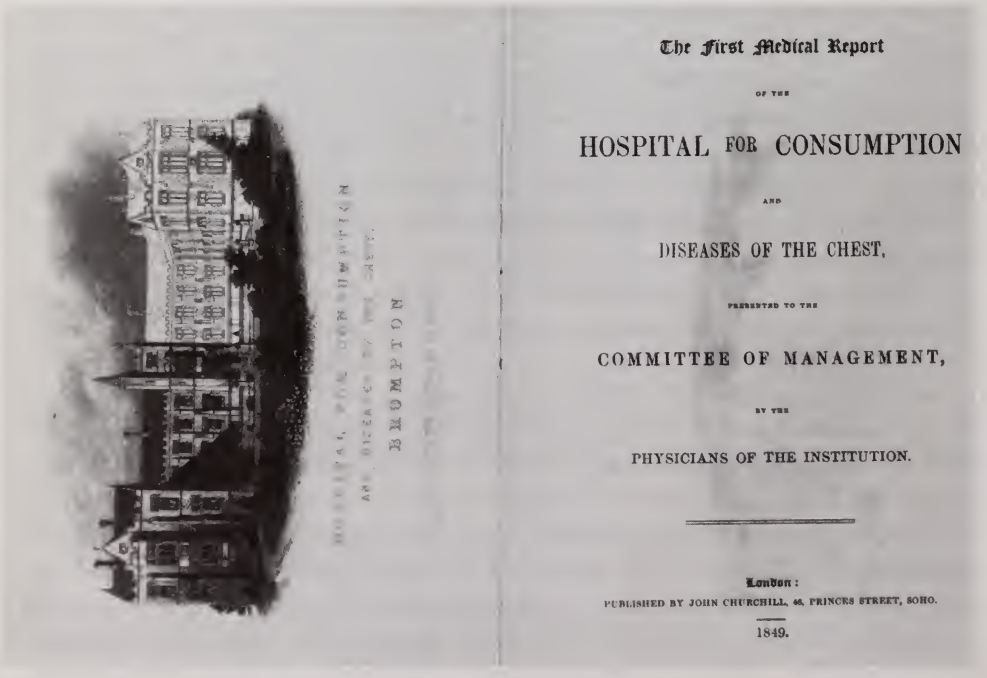


Figure 2. Title-page of the Brompton's 'First Medical Report,' 1849.

disease and had compiled careful statistics. They had investigated all drugs which were then thought to be of use, such as iron, naphtha and cod-liver-oil. They concluded that the last-named was by far the most beneficial. They were, of course, struck by the many astonishing weight-gains recorded, although they recognised that these were not always accompanied by long-lasting improvement in general condition. It is hardly surprising that so many patients responded to the care, comfort, rest, feeding, milk, and cod-liver-oil. Many must have come from poor homes and had been undernourished, overworked, and employed in poorly ventilated buildings.

The physicians included in their report a table of occupations. This report shows that many were employed in trades which were traditionally considered conducive to consumption. Many women, for example, worked as seamstresses or makers of straw bonnets and would most certainly have worked under conditions of sweated-labour. At this time all the Brompton patients came from what were called the labouring classes; indeed, it was precisely to meet their needs that the Hospital had been called into existence.

The poor could not afford to be ill. Wealthy consumptives were often sent to the south of France, or various other parts of Europe, or even further afield, but many of them had the same outcome as the poor. Until it was given up in 1871, the old Manor House at Chelsea continued to be used both for patients awaiting admission to the Brompton and as a convalescent home. To some extent its activities were conducted by a Miss Marston at a place called the Radnor Street Home. In May, 1851, the Brompton Committee considered collaborating with a society established in Madeira for providing a sanatorium for consumptives on that island. Plans for this fell through, as by 1852 the Brompton was planning to build its own sanatorium at Bournemouth, to accommodate 30 to 40 patients. Although closely allied to the Brompton, it was financially independent and a few years later became entirely separate. In the event, Bournemouth proved to be far too distant and its use became limited to local cases; but in fact the Brompton was the first institution that deliberately planned a sanatorium, although the principles of what was to become known as open-air or sanatorium treatment were still in the future.

The Madeira project was revived by one of the Brompton physicians in 1864, and as an experiment, 20 male patients were sent out to pass the winter there. After a stay of a few months they returned; the medical staff concluded that their progress was no greater than might have been expected if they had remained in England. The experiment was not repeated but the incident shows the progressiveness of the Committee.

In 1879 a major extension to the Brompton became possible when a Miss Cordelia Read left the hospital £100,000, which enabled construction of the south block and brought the number of beds up to 368. This enlargement naturally involved the Committee in greatly increased expense and was almost an

embarrassment, as it led some of the public to think that the Brompton no longer stood in great need of support.

A splendid spirit of confidence and optimism activated the work of these early Committees of Management. They stated that they had long ago concluded there was little point in appealing for money for extensions or other purposes unless work had actually been started. They reminded supporters that the Manor House, and later the Brompton, had been started at a time when little of the necessary money was actually in hand. Although there were times when shortages of money delayed expansion, and sometimes wards had to be closed, appeals to the public usually met with a good response. For this reason the history of the Brompton shows almost continual growth and expansion.

In 1894 the medical staff drew the Committee's attention to the need to improve facilities for clinical studies, although by then the Brompton had already been recognised as a place where attendance on clinical practice was accepted as part of students' requirements. The University of London took note of the special contribution that such hospitals as the Brompton were making to postgraduate medical education by including it with three other special hospitals in a London Postgraduate Association in 1898. This broke up in 1913, although the Brompton continued to be included in the list of institutions having recognised teachers. Throughout the 19th century a fairly regular program of lectures and demonstrations formed part of the Hospital's activities. The old Brompton Hospital Medical School had as its first dean Dr. W. J. Fenton, who was succeeded by Dr. Maurice Davidson. After the 1939-45 war, he was followed by Dr. (later Professor) J. G. Scadding. With the development of the Institute of Diseases of the Chest after the war, we can see how the visions and hopes of the founders were finally realised.

By the turn of the century several things of importance had happened. Koch had discovered the tubercle bacillus, putting an end to age-old uncertainties as to the true cause of the disease; in the same year (1882) Forlanini published his first (theoretical) paper on artificial pneumothorax; Roentgen had discovered x-rays; the first, tentative steps in thoracic surgery had been taken on the continent; and the National Association for the Prevention of Tuberculosis had been founded in Britain. The discovery of the tubercle bacillus did not bring about any immediate change in the tuberculosis situation as far as patients were concerned, but it did mean that at last the cause was known and the medical profession had to rethink its ideas.

Artificial pneumothorax was to be hailed as perhaps the greatest advance in treatment up to that time. Although this procedure was to have a long vogue, in fact right up to the advent of modern chemotherapy, its general acceptance was to be delayed for some years. The first artificial pneumothorax was not induced until October, 1911. Although x-rays were quickly applied to almost all branches of medicine and surgery, including the chest, their general use in the diagnostic

routine was also to be delayed. The Brompton had appointed its first radiologist in 1900, but the names usually associated with the development of this department are those of Stanley Melville and Rupert L. Rawlinson. These two men, by the high standards of their films and their interpretations, fostered interest in radiology. Later in the early 1930s one of the first, if not the first, mass x-ray surveys in England was carried out by Drs. R. C. Wingfield and Margaret Macpherson. In the 1950s and 60s the work of the late George Simon in radiology was to be of international importance. Work on thoracic surgery was delayed until problems of physiology and anesthesia could be solved.

The work of the National Association for the Prevention of Tuberculosis in Britain, and similar bodies abroad, had helped to focus the attention of medical men, administrators, and interested laymen on preventive aspects of tuberculosis; by now the work of Brehmer, Dettweiler, Walther, Trudeau, and other sanatorium pioneers was better known. The Brompton had long desired to have what the Committee often referred to as a country branch or convalescent home, and in June, 1904, decided to build a sanatorium at Frimley, about thirty miles from London. Here, under the guidance of Marcus Paterson, the principles of graduated labour were applied to a working-class sanatorium. Although guided to some extent by the ideas of Otto Walther and the Nordrach sanatorium, Paterson developed Frimley largely along his own lines. Some have questioned the value of his work, based upon his concept of 'auto-inoculation'; but there is no doubt that in his own day he was widely regarded as one of the most forward-looking figures in the anti-tuberculosis movement. Apart from anything else, he educated his patients to look after themselves, and he attached great importance to rehabilitation. When he went to Frimley, the value of sanatoria was as yet unproven; and indeed, many feared that the prolonged stay encouraged the work-shy habit and even hinted at inevitable moral deterioration which might accompany such a thing.

Like most of the early sanatorium pioneers Paterson was a man of strong personality. In fact he had to be, as in those early formative days he had to do almost everything himself. He ruled over Frimley in an autocratic yet benign way. He censored the incoming mail of his patients on the grounds that it might contain things which could affect the patients' temperatures. This was important, as it largely governed the various grades of work to which they were assigned. These varied from simple gardening tasks to participation in the building of a huge reservoir to contain half-a-million gallons. For those patients on the higher grades the work was purely common labour, although it was always done under close supervision and with proper regard to the patient's general physical state. Most learned that the somewhat strict regime was in their best interests and readily accepted it. Follow-up was considered important. One day Paterson was sitting in his office when he saw a patient who had discharged himself in the act of leaving. He called out to him 'Oh by the way, tell your widow to send me a

postcard.'

In the period between the two world wars the Brompton continued to expand. In 1906 a Throat Department had been started; this was important because laryngeal tuberculosis was a common complication. A Cardiac Department, under A. Hope Gosse, a pupil of Sir James Mackenzie, started in 1919. A Lady-Almoner's Department was established in 1904; I think the Brompton was the first special hospital to make such an appointment. A Pathology Department had existed since 1869, when the first curator and pathologist was Richard Quain; by 1924, the Musuem had more than 400 specimens. Arthur Conyers Inman was appointed as first Superintendent of the Clinical Laboratories. His department attracted many postgraduate students from overseas. By 1924 the Nursing Staff consisted of a matron, 12 sisters, and 62 nurses. Over the years the work of the nurses has expanded almost out of recognition, since they have been called upon to face even greater responsibilities, caused by the development of special techniques in medicine, surgery, and therapeutics.

Two interesting features of the Brompton were the compressed air room, considered beneficial in cases of chronic bronchitis and emphysema, and the creosote room. The latter was said to be popular with patients suffering from bronchiectasis, as the fumes were believed to encourage expectoration.

Between the 1920s and the dawn of modern chemotherapy, the greatest advances in treatment came from the Brompton surgeons. The names of James Ernest Helme Roberts and Arthur Tudor Edwards are particularly associated with this period. In 1924, Tudor Edwards published the first account in the English literature of thoracoscopic division of adhesions. By 1927 he had removed 7 intra-thoracic new growths with only one death. Helme Roberts started tourniquet lobectomies in 1931, and in the same week he and Tudor Edwards did the first two one-stage tourniquet pneumonectomies for bronchiectasis at the Brompton. The first dissection lobectomy at Brompton was done by Tudor Edwards in April, 1929, and in March, 1935, the first dissection pneumonectomy for peripheral carcinoma of the lung was performed by the late Sir Clement Price Thomas. In 1939, Tudor Edwards reviewed 199 cases of bronchiectasis treated by 166 lobectomies and 33 pneumonectomies. His experience in the treatment of tumours of the lung was reported in two important papers in 1938 and 1946. The work of these two thoracic surgeons was supported, and indeed made possible, by their anaesthetist colleagues, Sir Ivan Magill and others. One must also mention the support and encouragement they received from some of their more forward-looking medical colleagues, such as Sir Robert Young, L.S.T. Burrell, and Maurice Davidson. Helme Roberts was responsible for bringing Miss Winifred Linton to the Brompton as the hospital's first physiotherapist. The work of this lady and her successors has been of international significance.

The first consulting surgeon was the great Robert Liston, who in 1846, the year

the first wing of the Brompton opened on its present site, had performed at University College Hospital the first operation under ether in Britain. Later, Lord Lister joined the staff as consulting surgeon.

The early members of the medical staff — Roe, Walshe, Cotton, Thompson, and Quain — all made contributions to our knowledge of chest diseases. They were splendid observers, and probably had as good a knowledge of consumption and other chest diseases as it was possible to have at the time. Cotton and Quain are said to have been responsible for the rapid development of the great reputation enjoyed by the out-patients department. Before the end of the century the name Brompton was almost a household word in London, and was known even further afield.

John Hutchinson was another member of the staff who made notable contributions. His pioneer work on the spirometer, which he used to study the vital capacity in more than 4,000 persons ranging from princes of the blood to pugilists and from dwarfs to draymen, was very important. This work was done before Hutchinson came to the Brompton and was doubtless instrumental in securing his appointment as assistant physician in 1855. The early medical staff had been quick to use the spirometer and had included their observations on it in their famous First Medical Report of 1849. Edward Smith was one of the few Brompton physicians who carried on Hutchinson's work in respiratory physiology. James Edward Pollock published an important book on the prognosis of consumption, based on 3,5000 cases seen at the Brompton. This typified the thorough use that such men made of the special opportunities they had for the study of chest diseases. The most generally eminent figure who served on the staff in the 19th century was Sir John Burdon-Sanderson. His fostering of many new techniques in experimental medicine was of special importance. While at the Brompton he carried out investigations which in the main confirmed the value of Villemin's work. He later succeeded Sir William Osler as Regius Professor of Physic at Oxford.

In the 1870s Sir Richard Douglas Powell, one of the great clinicians of the day, published the first edition of his standard work on diseases of the chest; it went through six editions by 1921. In this book it is possible to trace in successive editions the gradual reception of many things which were destined to influence the understanding or treatment of tuberculosis. Other eminent clinicians at the Brompton in the 1890s were Sir James Kingston Fowler and Percy Marmaduke Kidd. Sir James was known for his many *obiter dicta*, which included such remarks as 'no fool is ever cured of pulmonary tuberculosis.'

Sir Robert Arthur Young is remembered as a great clinician and teacher, and for the support he gave to his surgical colleagues in the early days of thoracic surgery at the Brompton. Dr. Maurice Davidson is remembered for his scholarship, his old-world charm, and his great affection for the Brompton.

In 1948, when the National Health Service came in, the Brompton and London Chest Hospitals were united under a single Board of Governors, as the teaching hospitals of the Institute of Diseases of the Chest. The Institute officially opened in 1949. In 1971 a merger took place between the boards of governors of the National Heart Hospital and of the Hospital for Diseases of the Chest, becoming the National Heart and Chest Hospitals. This change was followed in 1973 by the amalgamation of the old Institutes of Diseases of the Chest and of Cardiology to form the Cardiothoracic Institute. The latter is one of the Institutes of the British Postgraduate Medical Federation, which, in its turn, is part of the University of London. And so today we have the Brompton, the Brompton Hospital, Frimley (which has reverted to its original role as a country branch and convalescent home), the National Heart Hospital at Westmoreland Street, the London Chest Hospital at Victoria Park, and the two ends of the Cardiothoracic Institute at Brompton and at Beaumont Street, plus a branch of the Institute at Victoria Park.

The hospitals and the associated Institute make up one of the most important groupings in the sphere of cardiothoracic medicine and surgery. Their work reflects the immense changes which have taken place since the advent of modern, effective chemotherapy, which has transformed out of all recognition the age-old picture of tuberculosis. If today the founders and early members of the medical staff could revisit the scene of what has been so aptly called 'a great adventure,' they would, of course, be struck by the amount and extent of the work that is going on. They would also note that much of this is being carried out in an old Victorian building which would be instantly recognisable to them; the outside has hardly changed since 1854, when the east wing was added.

The present-day Institute is concerned with a wide variety of teaching and research in its special field. Unquestionably the founders would have been gratified to know that one day their hopes and plan had achieved such great successes.

If it were possible for that great humanitarian, Sir Philip Rose, to visit the scene of his triumph, he would see that tuberculosis is at last under the control of medicine, at least in advanced countries. While he would rejoice at this, he would be dismayed that in many parts of the world tuberculosis continues to be a source of death and suffering to many. He would also perceive that although tuberculosis no longer occupies the major role it once did in the attention of the Brompton staff, today they are called upon to deal with an ever-widening range of other thoracic and cardiac ailments.

For some years now plans have been going on for a great, new cardiothoracic centre which will house rebuilt Brompton and National Hospitals, as well as accommodate the Institute, and which will be built in or near the Brompton area. Just what form this will ultimately take is anyone's guess, as all these things are governed not only by medical, but also by financial and political considerations.

Cardiothoracic Institute
University of London
London, S.W.3, England

Galen *On Tremor, Palpitation, Spasm, and Rigor*

Galeni *De tremore, palpitatione, convulsione, et rigore*

DAVID SIDER and MICHAEL McVAUGH

GALEN'S short work *De tremore (Peri tromou)* was probably written between 169 AD and 180 AD, during his second stay at Rome.[1] To our knowledge, it has not previously been translated into a modern language, although four translations from Greek into Latin were prepared in the sixteenth century.[2] The translation given here is based not on the text printed by C.G. Kühn,[3] but on our own collation of the manuscripts. (All passages where our translation deviates from Kühn's text are identified in the notes.) Of the ten manuscripts of the complete work identified by Diels,[4] no fewer than seven are apographs of the twelfth-century MS Vat. Gr. 1845, ff. 171v-197 (=V), and this manuscript together with MS Venice S. Marco Gr. Z. 282 (=648), saec xv, ff. 183-

ACKNOWLEDGMENTS

We are grateful to John Scarborough for his help with Galen's drug lore. Many suggestions were offered for improving the translation by Phillip De Lacy, Richard J. Durling, Fridholf Kudlien, and an anonymous referee, to all of whom we offer heartfelt thanks.

1. Johannes Ilberg, "Über die Schriftstellerei des Klaudios Galenos. III," *Rheinisches Museum* 51(1896) 177-178, 194 (=72-73, 89 of reprint ed. Darmstadt 1974). Ilberg misses the reference to *de Motu Musculorum* on p. 638 K.

2. Richard J. Durling, "A Chronological Census of Renaissance Editions and Translations of Galen," *J. Warb. Court. Inst.*, 24(1961) 288 (no. 80). A brief English summary of *De tremore,* not entirely adequate, may be found in R.E. Siegel, *Galen on Psychology, Psychopathology, and Function and Diseases of the Nervous System* (Basel 1973), pp. 69-71.

3. *Galeni de tremore, palpitatione, convulsione et rigore liber,* in *Claudii Galeni Opera Omnia,* ed. Carolus Gottlob Kühn, VII (Leipzig 1824), 584-642 (=k). Kühn's text is essentially that of Chartier's 1679 edition, which in turn depends in large part on its predecessors. As these contain readings worth consideration, we occasionally refer to them in our textual notes by the following symbols:
a = *Galeni Opera omnia,* ed. J. B. Opizo; Venice (Aldus Manutius and Andrea Asulanus), 1525, pars III, ff. 89-93v.
b = *Galeni Pergameni . . . Opera omnia,* ed. J. Camerarius, L. Fuchs, and H. Gemusaeus; Basel (A. Cratander), 1538, pars III, pp. 364-373.
c = *Hippocratis Coi et Claudii Galeni Pergameni . . . Opera,* ed. R. Chartier; Paris, 1679, tom. VII, pp. 199-219.

4. H. Diels, "Die Handschriften der antiken Ärzte. Griechische Abt. I. Hippokrates und Galenos," *Abh. d. Königl. Preuss. Akad. der Wiss.,* phil-hist. Kl. X, 2 (1905), 82.

189v (=B) has been of most value in establishing the Greek text.[5]

De tremore was translated into Syriac by Ḥunain ibn Isḥaq and then into Arabic by Ḥubaish in the ninth century.[6] No manuscript of the Arabic or Syriac texts has yet been found, but the Arabic version was rendered into Latin in 1282 by the Catalan physician Arnald of Villanova. The text of Arnald's translation (=Arn; here taken from MS Oxford, Merton College 230, saec. xiv, ff. 45-51v) thus represents a very different tradition from that of the surviving Greek manuscripts, and has occasionally proved quite useful in restoring the Galenic original.

The numbers given in the margin are references to the corresponding pages of Kühn's Greek text. As Kühn's division of *De tremore* into chapters derives from a seventeenth-century edition rather than from the manuscripts, we have not retained it, and have instead used headings set in italics to expose the structure of the work more clearly to the reader. All paragraphing is of course our own as well.[7]

---

5. One of the ten, MS Paris BN Suppl. 35 (15th-16th c.), we have not yet seen. In addition to these, MS Florence Laur. plut. 74.12 contains (p. 28) a single paragraph from *De tremore,* which appears to agree with B. For a description of V, see Diethard Nickel, *Galen: Über die Anatomie der Gebärmutter (deUteri dissectione),* CMG V 2.1. (Berlin 1971), pp. 13 f.; for B, cf. B. Alexanderson, *Galenos. Περὶ κρίσεων* Göteborg 1967), pp. 29 f.

6. G. Bergsträsser, "Ḥunain ibn Isḥaq über die syrischen und arabischen Galen-Übersetzungen," *Abh. f. d. Kunde des Morgenlandes,* XXX 17:2 (1925, rp. Nendeln, Liechtenstein 1966), p. 31 (in the Arabic text); p. 25 (no. 60) in the German translation.

7. Our work was completed and submitted for publication before we learned of Myrodes Z. Konstantinides, *The Greek Manuscripts of Galeni: De Tremore, Palpitatione, Convulsione, et Rigore Liber, with a Critical Edition of Chapters 1-5.* PhD Dissertation, New York University, 1977. He reports (pp. 33-36) that MS Paris Gr. Suppl. 35 is related to but independent of B (see above n.5). The additional readings supplied by this manuscript do not affect our translation of Chapters 1-5 (K VII 584-606).

ON TREMOR, PALPITATION, SPASM, AND RIGOR[1]

Vol VII Kühn *Introduction — purpose and definitions*

584] Since Praxagoras[2] the son of Nicarchus, one of the best of physicians and especially skilful in his physical theories, does not seem to me rightly to understand pulse, palpitation, spasm, and tremor, but thinks all of them to be affections of the arteries which differ only in magnitude, it seemed best to me to treat all these together in the following work — not so that I might
585] refute Praxagoras' errors (for his student Herophilus[3] did this adequately) but so that where he is correct I might complete his account. As for the pulse, its origin and nature, this has been treated in my work on the pulse,[4] and will be mentioned here only so far as it appears useful to the present discussion; but I shall treat the other subjects in the following treatise,[5] making a beginning from this point.

Perceptible motions in the bodies of animals (when they are healthy) appear to be of two kinds: (1) those due to impulse or will (or however those

1. Variations in the title occur, not only in the manuscripts of *Peri tromou* (Περὶ τρόμου καὶ παλμοῦ καὶ σπασμοῦ καὶ ῥίγους) itself (as might be expected), but also in Galen's own references elsewhere to this work (Roman numerals refer to the volume of Kühn's edition): *Tremor Palpitation Spasm Rigor: de Diff. Puls.* VIII 724; *Tremor Spasm Rigor:* [*in Hipp. de humoribus* XVI 333]; *Tremor Spasm Palpitation Rigor: in Hipp. Epid.* III XVIIA 518 (=CMG V 10, 2, 1.23 [Wenkebach]); *Rigor: in Hipp. Epid.* I XVIIA 167 (=CMG V 10, 1.85 [Wenkebach]), *in Hipp. Epid.* VI XVIIB 300(=CMG V 10, 2, 2.312 [Wenkebach-Pfaff]), *in Hipp. Aph.* XVIIB 736.

2. For recent accounts of Praxagoras, see K. Bardong, in Pauly-Wissowa, *RE* 22.2 (1954) 1735-1743; P.M. Fraser, *Ptolemaic Alexandria* (Oxford 1972) I, 345 ff.; E.D. Phillips, *Greek Medicine* (London 1973), pp. 135-138. For the ancient testimony, see F. Steckerl, *The Fragments of Praxagoras of Cos and his School* (Leiden 1958).

3. See C.F.H. Marx, *De Herophili ... meritis* (Gottingen 1840); Fraser, I, 348-356; and Phillips, pp. 139-145. The fragments of Herophilus have been collected for forthcoming publication by H. von Staden. For Praxagoras and Herophilus's work on pulse, see Steckerl, frg. 26-28, and pp. 21-27; Galen VIII 592, 726. On Herophilus in general, cf. Paul Potter, "Herophilus of Chalcedon: an Assessment of his Place in the History of Anatomy," *BHM* 50(1976) 45-60.

4. The following works on pulse are found in the Galenic corpus: [*de Pulsibus ad Antonium*] (XIX 629-642), *de Pulsibus libellus ad tirones* (VIII 453-492), *de Causis pulsuum* (IX 1-204), *de Differentia pulsuum* (VIII 493-765), *de Diagnoscendis pulsibus* (VIII 766-961), *de Praesagitione ex pulsu* (IX 205-430), *de Usu pulsuum* (V 149-180), *Synopsis librorum de pulsibus* (IX 431-549). For an account of "Galen's Pulse Lore," see C.R.S. Harris, *The Heart and Vascular System in Ancient Greek Medicine* (Oxford 1973), ch. 7.

5. Reading γράμματι with the mss. (πράγματι edd.).

clever at this sort of thing but careless of knowledge of the facts themselves[6] want to name them), i.e., those acting through the nerves[7] and muscles, which it is customary for physicians to call voluntary actions; (2) other motions acting in the bodies of animals through the arteries and the heart, which they call vital. (There is a third kind of motion in the veins, not perceptible, concerning which I need say nothing at present.) The motion
586] which acts through the muscles and nerves, by which we move the hands and legs, is manifest when we are sick with tremors, spasms, rigors, and sometimes with palpitations; for all such affections are discordant motions of the same organs through which, when they are healthy, the voluntary actions are accomplished.

Tremor caused by weakness of motive force

Tremor, then, arises from a weakness of the force that supports and moves the body. For it is surely not that the parts of animals, being so heavy and naturally tending downwards, derive whatever power of motion they have from themselves; rather, it is the motive force transmitted from the source through the nerves to the muscles which acts like the motion's carriage or wings for the parts. When the parts lose this force completely, and they lose it when paralyzed, they are borne down and fall downwards like a bird that has lost its feathers; at this point no motion remains to the parts thus affected. But if some of the force should persist, but so little and weak that it cannot adequately support and maintain the parts of the body (just as if they were some heavy load that it could not move), the part of the body thus affected will necessarily be seen to tremble. For motions which
587] are too strong for weak parts of the body grow violent and involuntary, and hence are tremulous. I suspect[8] that you have often seen how someone trembles in the legs who has lifted a heavy burden and then tries to force himself to take a step with it; and if he should try to lift something overheavy with his hands, how his hands tremble. Similarly whenever a

---

6. τῶν B αὐτῶν V αὐτῶν τῶν legimus.

7. Galen seems to use *neura* for either sinews or nerves, despite his knowledge that they are different; cf. *de Plac. Hipp. et Plat.* V 203f., where *neuron* is distinguished from *syndesmos* (ligament) and *tenōn* (tendon). We translate as seems appropriate, reserving "neuron" and "neura" for those passages where either sinews or nerves could be meant. Cf. Rufus Eph. *Anat.* 74 (185 Daremberg-Ruelle) "According to Herophilus some [*neura*] are voluntary and some are situated from the brain along the spinal chord; and some connect bone to bone, others muscle to muscle and bind the joints together." And in general, see F. Solmsen, "Greek Philosophy and the Discovery of the Nerves," *Museum Helveticum* 18 (1961) 150-197 (reprinted in id. *Kl. Schr.* I [Hildesheim 1968], 536-582).

8. Here begins a lacuna in V and its apographs, which continues until 589.5 K.

man <who is afraid>[9] wants to do something with his hands or to take a step, his hands tremble when he tries to do something with them, and his legs tremble when he tries to take a step — for fear reduces the strength of the motivating force no less <than the other things>.[10] If once this strength should dwindle and become weak, everything becomes a burden, even if it is very light. Thus even the body of the animal, which was light before, weighs it [the strength] down like a heavy load. Just so the aged are often tremulous from weakness; and in all those in whom the strength of the body is worn out owing to sickness, motions are tremulous. The force moving and lifting the parts in all those who are thus disposed having now become weak can
588] no longer lift what it naturally could before, just as if it were shrinking from motion. Where the whole natural tone gives way, the bodies bereft of the power that lifted them are borne downward because of their own weight and remain there, just as we find in cases of paralysis,[11] where the whole motive force has lost its strength. As much as this force[12] as remains attempts to lift it back up again, but owing to weakness it now cannot do as much as it wants; it lifts up a little, but for the most part is deficient, and in this way leaves the motion incomplete and curtailed. Again, therefore, it allows the bodies to drop. When this happens continually, and the motion downward always meets the motion upwards, and likewise the motion upwards joins the downward motion, the whole motion is twofold and composite, with the parts always changing their places. The name of the condition is tremor: when 1) bodies fall downward because of their weight, and 2) there follows an opposing upward motion produced by the motive force.

Tremor and palpitation differentiated by the motions involved

But perhaps someone may say that palpitation too, just like tremor, is an
589] unwanted and involuntary motion, the palpitating parts moving up and down. How therefore will tremor differ from palpitation? Up to this point they appear in no way to differ from each other. Yet they *are* different: for I say that in the case of palpitating parts, neither the affected place nor the cause nor the symptom is the same. For no one trembles who does not choose to move his limb; but palpitating parts palpitate even if they happen to be at rest, or even if you should initiate no motion in them. In this respect many are deceived who see trembling heads and seemingly motionless hands and outstretched legs; in fact, the latter are trembling just as much. It is necessary to teach these men a fact which I am not the first to mention,

9. ὅταν φοβῆται. bc Arn (cum terretur) om. Ba.

10. τῶν ἀλλῶν. bc Arn (aliis causis) om. Ba.

11. παραλύσεσιν edd. περιλύσεσιν B.

12. αὐτῆς ck αὐτοῖς Bab.

but which has been said by many of the ancients:[13] that it is not only what seems to move which is actually in motion. In fact, many things seem to be motionless, occupying one and the same place, which nonetheless move. For example, birds are yet in motion, not only when moving up and down
590] but even when occupying one single spot in the air. If a dead bird were to be positioned in that spot it will readily fall to earth, sinking under its weight. From which, it is clear that the body, remaining in the same spot, stays aloft because it employs some certain motion — the very amount it would have had if it had happened to be borne down under its own weight alone. Thus, what you think to be immobility is a motion compounded from two motions, capable of moving the body in opposite directions. If you eliminated the upward tending motion, you would certainly see the other readily moving the body downward. Hippocrates, too, teaches this, saying, "To stand is not at all good for wounds," and, again, "if there is a wound on the leg, it is not sitting, not walking about, but keeping quiet and motionless that is best for it."[14] He here praises quiet and motionlessness as beneficial; but standing and sitting, he says, are not at all beneficial, being something other than motionlessness and quiet; for even then the muscles supporting, lifting from the ground, and righting the body have been tensed. For this reason standing is no less tiring than walking about, since it too is a motion.
591] Thus when the soul, which moves and keeps the body erect, is removed, you will surely see lying on the ground that which was previously upright; whence it is clear that even when it was upright, it was not immobile, but had something lifting and supporting and raising it. I would not even consider entirely immobile a man reclining with his legs relaxed, if he should be keeping his head raised. Surely he would sink down to the level of his feet, collapsing from the higher regions to the lower, if he did not apply a force equal and opposite. That is why Hippocrates said: "It is a worse sign if someone should slip and fall from his bed to the floor," for the surest proof of a completely weakened [motor] force is to fall to the floor and lie there.[15] For not to be able to stand or sit or rise is terrible, yet less terrible; for many sick people reach this point without having reached the ultimate stage of weakness. But not being able to recline like a living being, but falling down

13. Galen's description of dynamic balance of opposing forces (which follows) derives from Stoic theories, where it is called *toniké kinesis*, tensional or tonic motion; cf. S. Sambursky, *Physics of the Stoics* (London 1959), pp. 29-33; F. Kudlien, "Die Pneuma-Bewegung. Ein Beitrag zum Thema 'Medizin u. Stoa,'" *Gesnerus* 31 (1974) 86-98. For the dynamic balance of the outward moving heat and the inward moving cold, see below, 618 K.

14. Hipp. *On Wounds* 1 (VI 400.12-15 Littré).

15. Hipp. *Progn.* 3 (II 118.14-15 Littré=197.10-11 Alexanderson; cf. CMG V 9,2. 229-230 (Heeg). We translate ἐπὶ τοὺς πόδας as "to the floor," which may also be the meaning intended by Chadwick-Mann, "fallen forward away from the bed towards his feet" (*The Medical Works of Hippocrates* [Oxford 1950]); but cf. W.H.S. Jones, *Hippocrates II* (Loeb Lib.), p. 13 n. 1.

592] just like a dead or inanimate body, is the worst of evils. This Hippocrates called prostration *(erripsis)* in *On Humors*[16] — on which very point the commentators on this work, in their general failure to understand prostration, frequently write nonsense of one sort or another. He says that prostration is a falling down in the manner of a lifeless body, when all the muscle tone is completely relaxed and destroyed, so that prostration is not the same as reclining, but bears the same relation to it as falling down does to reclining. Thus, it is one thing for birds to fly down to the ground, another to fall to the ground: one is active, the other passive. Similarly, therefore, reclining is active, prostration is passive.

Why have I said these things? So that you will not think that those who lift either a leg or hand and then keep it as it is are motionless, not even if they maintain one and the same position as fixedly as possible. If you do not wish to agree that those so disposed are in motion, you will yet surely agree that they manifest activity, and that this force is twice that of the simple activity. For in the simple activities one kind of muscle acts, either that flexing or that extending the limb; but whenever you keep it extended, both
593] kinds of muscles act with equal strength. If you bear this in mind, you will always find this rule to be true, that tremor never arises in anyone who in no way undertakes to move; for tremor is a symptom of powerless and weak motion. Hence, as everybody would surely agree, in a body in which there is absolutely no motion, there can be no weakness or powerlessness in respect to motion.

Palpitation, however, happens even to the unmoved. For example, the eyebrow, eyelid, and eye are often raised altogether involuntarily. Hence, you[17] will clearly see, I think, that this has great importance both for an understanding of the nature of the condition and for an exact differentiation between it and tremor. For what appear to be risings and fallings in the parts which are palpitating are expansions of the bodies as they fill up, followed by collapses as they are in turn emptied. Motions in those who
594] tremble are of an entire limb, when it falls or is raised; nothing, however, is expanded or contracted. Because of this, the entire part trembles whenever we undertake to do something, none of it remaining motionless: muscles, arteries, *neura,* skin, veins, and one's very bones all move upwards and downwards with the same motion. But not everything palpitates. For example, you would never see a *neuron,* bone, cartilage, or anything else like this palpitate. For they do not have a cavity which in turn expanding or contracting would allow their parts to be lifted up whenever it expands and to collapse whenever it contracts. (We shall consider below whether

16. Hipp. *On Humors* 4 (V 480.9 Littré). Cf. n. 9 of Littré, on the meaning of *erripsis,* "prostration;" and Galen XVI 196-199.

17. Reading σε with B.

palpitation is an affection only of the muscles, as Herophilus thought, or also of the skin, or, as Praxagoras maintained, of the arteries,[18] for this inquiry is more properly taken up along with our investigation of the affected place.[19])

Now, however, let us return to our statement, that palpitation is an unnatural expansion and collapse, while tremor is an involuntary
595] alternating up-and-down motion of the limbs. Now, expansion is not the same as upward motion, nor collapse the same as downward motion. For things moving upward and downward leave their former place and move to a new one, while things expanding and contracting keep to their initial place, alternately filling and leaving the surrounding space. Hence, motion is common to both, to all that expands and contracts, and of course to all that moves up and down. It is in the nature of the former to occupy a lesser or greater place, never leaving the initial one; for the latter, to be always changing place, never remaining in the same one.

At this point, I think, it will be necessary for me to draw a distinction in order for our account to be strictly true. For often, when several muscles together or one great one palpitate violently, the limb is lifted up by their expansion and falls back down when they contract. Here it is not proper to call the involuntary rising and falling of the limb "tremor." For you will clearly see that the muscles by which the limb is moved are palpitating. And
596] the motion itself is unlike that in the tremorous. For example, when the motions of palpitating muscles keep the whole limb in motion, each of the motions is defined by its own discernible limits. This is not the case with tremor. When one motion is still beginning, as someone might say, you will find the opposite joined to it, so that the upward motion is continually succeeded by the downward, which is again continually checked by the former. Thus, the upward and downward motions are always incomplete. These are the signs of these illnesses that you are to look for, and they differ from one another by these symptoms.

Palpitations are caused by a gross pneuma swelling the parts; they are caused by cold and relieved by warmth

Next, it would be best to consider the place affected and the cause of the affection. I say that the cause of palpitations is a thick and vaporous pneuma having no outlet, and that if the part is to have a perceptible expansion, it is necessary for the pneuma to be collected in a cavity which is not too small.

18. For Herophilus and Praxagoras, see the sources collected by Steckerl, fr. 27.

19. See below, 598f.K.

This, in a nutshell, is the complete explanation. Given the speed with which motion increases and decreases, to prove your point you must in addition postulate a cause that is pneumatic in substance. For what else is able to
597] collect or to empty so easily except pneuma? As Hippocrates taught us, the things constituting man are solids, fluids, and pneumata. He reminds us of these when he talks of things "containing," "contained," and "rushing in"[20] — calling solids the containing, since they surround and confine the moist; the moist the contained, since it is surrounded by the solids; pneumata the things rushing in, since the pneumata reach into all of the body in an instant of time easily and without hindrance. Therefore a swift emptying or a filling, an expanding or a contracting, a falling or a rising, or any other motion, can be brought about only by pneumata. Hence the cause of palpitations:[21] the substance is pneuma, and the nature of the substance is moisture and thickness, as I said a little earlier when I named it thick and vaporous. For if it were ethereal, both rare and clear, it would pass through unhindered and would never fill or empty the parts. But that which is
598] thicker than the pores of the bodies in which it is collected and by which it is covered would fill any cavities the body might have, and raise and expand the surrounding material. If the body should have no cavity, it would collect between two bodies and would separate one from the other, making a new cavity for itself. This second kind of palpitation mentioned often causes palpitations of the skin, since the skin itself has no cavities; rather, under these circumstances, the pneuma collects between the skin and the underlying body. The kind of palpitation first mentioned most often arises in the muscles, where there are many small cavities.

Praxagoras, however, assigns the pulse to the arteries,[22] just as he considers palpitation, tremor, and spasm to be affections of the arteries. Pulse, he says, is a natural motion; palpitation, tremor, and spasm, although differing from one another in magnitude, are all unnatural motions. That he was incorrect in assigning palpitation to the arteries alone is not difficult to verify. For it is often possible to see the skin and the muscles clearly
599] palpitating, although no artery is present at that place; or if one happens to be, it is so small that one can clearly recognize that the extent of distension is not in accord with the size of the artery. Whether some are correct in assigning palpitation to the muscular parts alone seems to me more worthy

20. Cf. Hipp. *Epid.* VI 8, 7 (V 346.5-6 Littré), *On Breaths* 3 (VI 92-95 Littré=8-10 Nelson).

21. We translate as if there were a colon after *aitia*, but alteration of the text may be called for.

22. See above, n. 18.

of examination.[23] (I do indeed think that I have found the artery clearly exhibiting something like spasm as well as like palpitation, as other learned students of the pulse agree. But concerning this there is too much to say, and it has been said in my works on the pulse.)

Palpitations are often plainly seen to occur to many men in the skin alone, whenever a vaporous pneuma produced in one of its parts is checked and delayed on its way out. Thus, if gaseous pneuma is in excess in the muscles or any other part of the body, it will produce palpitation there. Since pneuma is thick and misty or cloudy or gassy (or whatever you want to call it), it is the cause of palpitation; for this reason, of the different age-groups, it is those who are colder who are easily affected by palpitation. Palpitation is also
600] more likely to occur in bodies that are colder (for any reason): — cold regions, the winter season, an idle life of surfeit and drunkenness, cold and gassy foods, and, all in all, everything that chills the body; the opposites of these immediately cause palpitations to cease. For warm things rarefy the pneuma and render bodies fine and soft. But cool things thicken, bring together, and force the pores of bodies to close; they thicken and solidify the pneuma and make it turbid. It is, therefore, readily retained, unable to dissipate both because of its own thickness and because of the denseness of the bodies surrounding it. Warm things, on the other hand, in contrast to cold, soften and relax, opening the pores of the body, thin out the pneuma itself and readily stir it into motion, and thus make it easy for the pneuma to exit. Because of this the early physicians sought out as remedies for palpitations anything that can thin and warm the body, preparations compounded of euforbium, pyrethrum, limnesia, sulfur, pepper, and
601] compound drugs of a similar nature.[24] They also employ hot spring water, especially praising water rich in nitre, sulfur, and tar. They also employ seawater, warming it, and, if seawater is not available, salt-water. And they give warming drugs to be drunk, especially those made with castoreum — which applied externally, not just drunk, is an excellent drug as it is able to heat and at the same time make subtle and fully dry.

---

23. There is some ambiguity in Galen's Greek, which we reproduce in our translation. According to this passage and what follows, 1) Praxagoras is wrong to assign palpitation to the arteries alone, because palpitation can also occur in skin and muscle; 2) it is worth considering the views of those who maintain that palpitation occurs in "muscled bodies" alone; and 3) palpitation manifestly often occurs in the skin alone. In 1), as context makes clear, palpitation, according to Praxagoras, can occur only in arteries. In 2) a muscle all by itself can palpitate. Similarly for 3) and skin.

24. Euforbium is most likely to be the drug and plant described by Pliny *NH* 25.38.77-88 (*Euphorbia resinifera* Berg). Pyrethrum may be *Chrysanthemum coccineum* Willd.; limnesia may be the *limnesion* said by Damocrates apud Galen XIII 1051 to be called *adarke*, which is a salt formation found on marshy reeds and grasses (Dioscorides 5.137).

Tremor is caused not by cold nor by a single cause, but by many

So all palpitation originates from cold, but for tremor there is more than one cause, and cold is not one of them. Rather, the condition giving rise to tremor is a weakness of the body's motive faculty; and there is more than one sort of cause able to produce this. Weakness of motion is caused either 1) by lack of nourishment, as in cases of choler, strong fluxes from the bowels, excessive hemorrhages, and fasting; or 2) when the vital force (*tonos*) is lost, as in stomachic and cardiac weakness; or 3) when violent and excessive chills take hold; or 4) when the burden carried by the body is too
602] much for the motive force. Nor, therefore, is there one sort of remedy for the tremorous as there is for the palpitating.

1) If they should tremble from a chilling, the warm is a remedy for them. Thus winter travellers, having taken a strong chill and arriving home half-dead and trembling, easily rid themselves of the condition by warming themselves. Similarly, we cure those shivering and trembling with attacks of chills due to fevers. 2) But if, in a sweat, the patient should become tremorous, as happens in cardiac and stomachic weakness, warming him is the worst thing you can do, for, in direct opposition to the previous case, it is necessary here for the surface to be astringed with such things as chill and compress and draw together the pores, not such as warm and relax and make them open. 3) And, if tremors arise for lack of nourishment (as in those fasting or excessively purged), there is no need of explanation, for it is clear to all that these people need nourishment.

4) On the other hand, purges are the remedies for all those who tremble because their motive faculty has been weighted down by an excess of humors, as Hippocrates instructs us when he writes: "A female slave of
603] Stymarges, to whom blood had not come when she bore a daughter; the mouth of the womb was prolapsed and there was pain in the hip and leg. She was bled at the ankle and was relieved, although tremors completely possessed her body. But it is necessary to get at the cause, and at the reason for the cause."[25] He mentions a woman who after childbirth was not made clean by the so-called "second childbirth," and who then became tremorous. I treated her, he says, by cutting the vein at the ankle even though tremors completely possessed her body. What else can he be implying here, except that no one else would have cut the vein? For tremor has been believed to be a cold sickness, yet the blood is warm. Therefore, no one would have dared to empty of blood in a sickness calling for warmth — but *I*, he says, dared this.

25. Hipp. *Epid.* II 4, 5 (V 126.10-14 Littré). For the name of the slave's owner the mss. of Galen and Hippocrates offer several variants, of which Stymarges is the most likely. Cf. J. Rosenbaum, *Ges. d. Lusteuche in Altert.* (Halle 1882) 232 f.

And he also teaches the reason why: "but it is necessary to get at the cause and at the reason for the cause." I understood, he says, both the disturbance and the cause of the disturbance. The disturbance was an excess of blood, the cause of this the inclination of the womb against the hip because of which the woman had not been emptied of the blood, which not having been
604] withdrawn as was necessary wandered about in the body as an unnatural burden. Hence, Hippocrates recognized that excess of blood was the cause of the tremor, and that the reason for the cause was an affection of the womb. Then, since the excess calls for a purging, and the affected part reveals the place from which it is necessary to purge, putting these two things together, he had phlebotomy done at the ankle: phlebotomy because he wished to withdraw blood, at the ankle since the womb was affected. It is, I think, clear to all that it is necessary to open a vein when blood is in excess since the blood is contained in the veins; but that it is necessary, when the womb is affected, to cut at the ankle or behind the knee, you could not understand unless I should first teach you by anatomical demonstration the communications of the veins. For one vein connects with one part of the body and another with another, and you should always purge along interconnecting veins. If, therefore, you should cut veins which in no way connect with the affected part, you will not heal the suffering part, and you will always harm the sound part. Therefore it always appears necessary for him who is to cure well to understand the cause of the affection. But this is enough concerning the cause of tremors.

No one place is affected in tremor

605] There is necessarily no one affected place in tremors, and here I find fault with Praxagoras and Herophilus — with the former for saying that tremor is an affection of the arteries, with Herophilus for being so eager to show that tremor is always associated with the nerves. Praxagoras is further from the truth; but Herophilus erred in attributing to the organs [i.e., instruments] an illness that is actually of the motive faculty. He understood correctly that it is the nerves, not the arteries, which serve the voluntary motions. But since the body of the nerves is not itself the cause of motion, but is only the instrument, and since the cause of motion is the motive faculty moving through the nerves, I find fault with him for not having distinguished faculty from instrument. For if he had made such a distinction, he would have straightway recognized that actions will suffer not only because of affections of the instruments, but also because of affections of the body's faculties. Thus, in dead men neither nerves or muscles experience anything such as Herophilus and Praxagoras think they experience, yet every motion has left them the instant the soul does, and
606] muscles and nerves are instruments of the soul. Hence motion does not

come from the muscle or nerve, but from the soul. Just so, pipe-playing is not an activity of pipes, nor lyre-playing of the lyre; pipe-playing is an activity of the pipe-player with the pipes as instruments, and lyre-playing that of the musician, the lyre being the instrument. Often the playing of the pipe or lyre is brought to a bad end because of the craftsmen of these activities, and sometimes because of damage to the instruments which they use. Similarly, the craftsman and artificer of voluntary motion in animal life is the faculty governing the animal, while the instruments are the nerves and muscles. Therefore lack of motion and incorrect motion are either due to affection of the instruments or of the faculty using these instruments. Hence, palpitations, spasms, and paralyses are injuries of the instruments, while tremors are affections of the weakened faculty.

Tremor distinguished from rigor

Tremor, therefore, has been clearly distinguished from palpitation; and you may distinguish tremor from rigor as follows. It is first necessary to consider what rigor is. This seems to be well known to all, but actually is
607] extremely difficult to define — not only for the reason that it is not easy to find the cause or the disposition of the body arising from the cause, but even more because men seem to me to be mistaken in the very description of the concept. For if you should simply call rigor a chill, as some have declared, the error is manifest: many are violently chilled, yet do not suffer rigor. But if you were to call it a violent chill, this would not be true either; for example, those suffering in the stomach or the heart are violently chilled, yet do not suffer rigor. Because of the shaking and agitation associated with violent rigor, many physicians have been misled into saying that rigor is chills with tremor. This is clearly refuted by the fact that the shaking does not occur to all those who suffer rigor, but only to those who suffer it violently; and to those to whom it does occur, it is not tremor that arises, but something like shock and agitation. For, as we have shown, tremor does not arise without a
608] decision to move the part, while the agitation associated with violent rigors is so violent and necessarily attacks the body so implacably that it is impossible to be still, no matter how hard one tries. Moreover, tremor is an affection of one part, rigor of the whole body.

Hence, I can only marvel at Plato for considering tremor to be the same as rigor. For if those who say that rigor is chill with tremor are wrong, how could he, thinking that to tremble is the same as to suffer rigor, be speaking the truth? Besides what we have already shown to be absurd, this too is against him, that some people tremble with no sensation of cold — for it is impossible to suffer rigor without seeming to have been chilled. Because of this it seems that even those who have said that rigor is a *feeling* of cold made no further headway towards understanding the affection, for you

certainly would not say that having been chilled and to perceive cold were the same thing. Parts which are slack and numb and without much or any sensation have all been chilled; and whatever is tremulous, frenzied, or
609] epileptic, and whatever parts are gassy, watery, emphysematous, or oedematous are all cold, yet no one who is such perceives the coldness in himself, hence[26] he would not suffer rigor; and if he did perceive it, he *would* straightway suffer rigor. Because of these things, therefore, I say that Plato was wrong to suppose that rigor and tremor are the same thing: for rigor is not the affection of one part, like tremor, nor is there perception of coldness in the tremorous, as there is in those suffering from rigor. Furthermore, the motion in the latter is entirely involuntary with no desire to move the parts, but in the tremorous does not exist without the[27] impulse towards motion.

Perhaps you can allow Plato to err in subtle medical matters (even though he has carefully examined the origin of almost all other illnesses in the body). You can still be amazed at Athenaeus of Attaleia,[28] for although he is much later than Plato, he not only follows Plato in his reasonings on these causes (which would be bearable), but also appears like him to be confused about the concept. For he did not draw a distinction between the concept of
610] rigor and of tremor, but described rigor somewhat as follows: "tremor and rigor follow upon this fighting and shock, the whole affection being cold; and the active agent itself has this name [cold]," as, he says, even Plato says. For he has given us the very language of Plato: the whole passage is as follows. "For the larger particles of moisture surrounding the body⟨enter into it, displace the smaller particles, and⟩,[29] not being able to enter into their space, they compress the moist things[30] within[31] us (which are the

26. I.e., if rigor = chill = the perception of chill.

27. τῆς VBa τοῦ bck

28. Athenaeus was a physician of the first century B.C. and a student of Posidonius (Galen, *de Causis contentivis* 2.1 [CMG Suppl. Or. II p. 54]) as well as the founder of the Pneumatic school (Galen, *de Diff. puls.* VIII 749). See M. Wellmann, *Die pneumatische Schule bis auf Archigenes* (Philol. Unters. 14), Berlin 1895 pp. 153 f.; F. Kudlien, "Pneumatische Ärtze," in Pauly-Wissowa RE Suppl. XI (1968) col. 1101 f. The passage from Athenaeus Galen goes on to quote is as he says almost word for word from Plato's *Timaeus,* 62a8-b6. This is fortunate for us, since the mss. and the printed texts dependent upon them are faulty and must be supplemented with words to be found in Plato. That Arnald has the missing words may indicate merely that Ḥunain or Ḥubaish also were forced to refer to Plato to make sense of the passage. What is clear is that Athenaeus could not have written what is in our mss., as it does not construe.

29. The words in diamond brackets are missing from the mss. of Galen, but are found in Plato and Arnald.

30. νοτερόν Plato Arn. (humidis) νοσερόν B νοσηρόν V.

31. ἔξωθεν (ἐξωθοῦντα V) τὸν ἕτερον Galen, but not Plato or Arn.; perhaps doublet of συνωθοῦντα τὸ νοτερόν. We ignore it in our translation.

smallest); they render the moist (which was irregular and mobile[32]) immobile owing to uniformity and contraction, and so make it rigid. But that which is unnaturally contracted naturally fights, and thrusts itself out in the contrary direction. And to this fighting and shock the names 'tremor' and 'rigor' are given; the whole affection is cold, and the active agent itself has this name."

Definition of rigor

It has now been clearly shown that tremor cannot be equated with rigor, still less with chill *tout court,* and certainly not with violent chill. Let us now examine our earlier statement[33] — that rigor is a *perceptible* chill — and see if this is correct. For some think rigor to be not a perceptible chill, but
611] rather a painful one. Now many healthy people say they are very much chilled (some, because of their love of cold, spend too much time in cold water voluntarily; others spend time in cold water because they have to), but do not suffer rigor immediately, just as someone who washed and then threw himself into cold water would not suffer rigor immediately. For unless he stays a long time, he would not suffer rigor, although he clearly perceives the quality of the cold. Hence, if indeed rigor is perceived cold, to the extent that men perceive cold, they would suffer rigor immediately. But they do not suffer rigor, and with good reason, for not all who have chills suffer pain: for example, all those who in summer, unable to endure the heat, throw themselves into cold water and take such delight in being chilled that they stay in the water until if you touched them they would seem as cold as ice.

Would it be sufficient to define rigor as painful cold, or is this still incomplete? Perhaps not all rigor can be so defined. In the case of the sick, to suffer rigor does not seem to be the same as to shiver or to be cold. We often
612] say that the onset of a paroxysm has come about in this man with rigor, in another with shiver, in another with chill alone (and there is the same usage of these terms in the writings of all the physicians). Whenever someone is chilled without shock and agitation, he does not suffer rigor: rather, if the condition is truly to be called rigor, it is necessary for it to be accompanied by an uneven and involuntary motion. Without this — if not even the skin is moved irregularly — it is called chill. If, however, the skin should tremble and shake from some attacks, but should not stir up the whole body with it, the condition is called a shiver, so that shivering is such an affection of the skin alone, just as rigor is of the whole body.

---

32. κεκινημένον οὔτε VB κεκινημένου τε Plato, which we follow.

33. See above, 607 K.

In the case of the healthy, we mean something else by "suffering rigor," extending it to every painful chill. If by reason of sickness rigor should arise, it is not enough simply to say this, rather it is necessary to add that the whole body is disturbed. Some criticize[34] this, calling the affection chill with tremor; but their explanation is not at all easy to follow. For one must not
613] call it tremor; better is "a certain involuntary shock" or "agitation" or "jolt," or some other such name, for "tremor" has been given to a particular affection. Those defining the unhealthy rigor as a chill seem to be describing merely the rigor found in the healthy. Yet it is all kinds of rigor[35] — the professed subject matter of the physicians — that ought to have been defined by these men. Now we call something unhealthy whenever the body has this sort of disposition, not from violent external cause, but from itself. This, I think, is what Hippocrates meant when he said: "when rigor supervenes there is release from him possessed by fever."[36] Therefore, you will not produce rigor by pouring cold water on the feverish; you can do so only when you elicit it from the very disposition of the body. This too is said in the same connection: "Ignorance (?) with rigor is bad; forgetfulness is also bad";[37] "rigors on the sixth day are difficult";[38] "rigors originate in women more from the loins through the back, and in men too more from the back than from the front."[39] In all these cases the rigor spoken of is not
614] the one occurring to the healthy, but the unhealthy rigor: a painful chill with a certain irregular shock and agitation of the whole body.

Rigor is a particular affection of the natural heat

Since we have now recognized what rigor is, let us next see what the active cause of the pathos is: first, what antecedent causes it most often follows, and then (for the sake of a complete understanding[40]) to what dispositions it supervenes. Now, that rigor is a condition that affects the natural (*kata physin*) heat of the body is agreed by almost all. But this whole argument requires a careful and intelligent listener. For I said that rigor is

---

34. ἐπαγόμενοι edd. ὑπειδόμενοι V (i.e., ὑπιδόμενοι) ἐπειγόμενοι B. We hesitantly follow the reading of V, which often means "mistrust, suspect."

35. γένος ὅλον VBa νοσερὸν ῥῖγος bck.

36. Hipp. *Aph.* IV 58 (IV 522.14 Littré); cf. XVII B 736.

37. Hipp. *Prorrh.* I 64 (V 526.6-7 Littré); cf. CMG V 9, 2.78 (Diels).

38. Cf. Hipp. *Aph.* IV 29 (IV 512 Littré).

39. Hipp. *Aph.* V 69 (IV 560.6-8 Littré) = *Epid.* II 3, 16 (V 116-7 Littré) = VI 3, 11 (V 296.14-15 Littré) and cf. XVII B 883-4.

40. For γενέσεως of the mss., we read γνώσεως, which we derive from *cognitionem* in Arn.

an affection of the natural heat, so that no one may think that I am speaking of heat from without, and that I am falsely charging Erasistratus, Praxagoras, Phylotimos, Asclepiades, and numberless others, who all think that the heat of the body is not innate (*emphyton*) but acquired from without. For how could they speak of an affection of the innate heat, when, to begin with, they do not know that heat is innate? But, as we said, not all agree that the heat is innate, contriving for it instead an external origin of
615] one sort or another. On one thing they are all agreed, that there is a certain proper amount of natural heat in each animal. Indeed, they say that rigor and shivering and all of chill can be traced back to this heat. Asclepiades, for example, maintaining that neither heat nor indeed anything else is an innate faculty, says rather cleverly that every fever is always created by blockages of masses in the pores, distinguishing among fevers by the size of the pores; he demonstrates which conditions must attend rigor and which do not. And I — if I did not think the account longer than proper, and think it unjust besides to consider Asclepiades alone and ignore the others, or if I were instead to attempt to mention everybody, I think that I would fall into an indefinitely long discussion; then, after considering all the opinions in turn, showing on what grounds each has a reasonable origin, or what is especially deceptive and where they go wrong, I would come to *my* views. But let this be put off to another time. (I do not approve of Athenaeus, who
616] says something about Asclepiades, Heraclides of Pontus,[41] and Strato the physicist, but mentions none of the others, although he could have spoken not only of *their* opinions about rigor, but of many other views no less notable and plausible.)

Let us, therefore, first agree that rigor is an affection of the natural heat in each animal, and then let us see how it arises. The argument will proceed from Hippocratic foundations. We do not posit masses and pores as elements of the body, nor do we declare that the heat comes from motion or friction or some other cause; rather, we suppose the whole body breathing and flowing together,[42] the heat not acquired nor subsequent to the generation of the animal, but itself first and original and innate. This is nothing other than the nature and soul of life, so that you would not be wrong thinking heat to be a self-moving and constantly-moving substance. These views have been argued in a separate work, and you may learn about

41. Heraclides, fr. 82 Wehrli; the reference to Strato, missed by both Wehrli and Gottschalk, "Strato of Lampsacus: Some Texts," *Proc. Leeds Phil. Lit. Soc.* 11(1965) 95-182, may be to his *Peri Nosōn* (D.L. V 59).

42. Cf. Hipp. *Nutriment* 23 (IX 106.6 Littré) = 143.1 Joly, with note).

617] them elsewhere.[43] For now, one must maintain continuity of argument. Since the innate heat is in constant motion, it moves not merely either inward or outward; rather, one motion continually succeeds the other. For the inward motion alone would quickly end in immobility, the outward one would disperse and thus destroy the heat. Being now quenched and now kindled, as Heraclitus said,[44] it thus remains constantly in motion. Hence it is kindled when it converges downwards, reaching for sustenance; it is quenched when it is raised up and dispersed in all directions. But it[45] has acquired motion upward and outward and, as one might say, an unfolding from its own starting place because it is hot by nature; it has also acquired motion inward and downward, that is, towards its own origin, because it contains a share of cold, having come to be a mixture of hot and cold. By reason of its heat, it is self-moved, and very much needs this property in order to act. Yet cold too is very useful for it. For heat is accustomed to rise up and bring along its nourishment; if cold did not prevent this, it would
618] proceed to the greatest heights. But cold *does* prevent heat from moving in this way, and thereby keeps it from dispersing and perishing. For there is danger that heat will leave the bodies because of its natural lightness and its tendency to move upwards. But the cold checks, hinders, and reduces the violence of this excessive motion.

Hence let us return to what we posited at the outset and show how rigor is an affection of the innate heat. For that an animal is healthy whenever it remains within the natural limits of its temperament does not call for explanation; this occurs, as Hippocrates said,[46] whenever hot and cold are in the proper balance. If, however, one should predominate over the other, the animal must sicken with a kind of sickness similar to the nature of the dominating cause. Hence phlegmons, erysipelas, herpes, carbuncles, ardent fevers, redness, and all feverish conditions occur whenever the faculty of heat predominates; spasm, tetanus, palpitation, stupor, paralysis, epilepsy, and paraplegia, on the other hand, occur when cold is dominant.[47] Rigor is
619] also one such illness, being not simply chill, but perceptible chill; whence it

43. For Galen's views on innate heat, see May, op. cit., I 52 f.; E. Mendelsohn, *Heat and Life* (Cambridge, Mass., 1964), ch. 2.

44. Heraclitus fr. B 30 Diels-Kranz = fr. 51 Marcovich.

45. The subject of this sentence is not made explicit. We take it to be the natural heat of the body, which is to be distinguished from pure heat in that the former unlike the latter has an admixture of some small but not insignificant amount of cold. In the passage below, the reader should be warned, Galen uses *to thermon* indiscriminately for the two kinds of heat.

46. Cf. Hipp. *Nature of Man* 4 (VI 40.2-3 Littré = CMG I 1,3.172f [Jouanna]); and cf. CMG V 9,1. 33 (Mewaldt).

47. Omitting πάθη with B (an intrusive gloss)

is necessary to call it "sudden" as well.[48] On the other hand, as Plato said,[49] "the gentle and gradual is imperceptible." If it is perceptible, then, it is necessary for it to move greatly and tremble suddenly. Hence there should be an imperceptible inward-chilling that comes into being over a long time, little by little, as well as a powerful chill that arises swiftly and which is always perceptible, as such a condition would not escape one's notice.

Such a perceptible condition is not a wholly painful form[50] of chill — at times it is even quite pleasant. For, to quote Plato again,[51] "an affection contrary to nature when it takes place forcibly and suddenly within us, is painful; a sudden return to the natural state is pleasant." Hence he says "the sudden" of both the pleasant and the painful, so that we not fail to notice that this condition is necessarily connected in this way; moreover, a return to the natural state is not merely perceived, but is pleasant while
620] abandoning the natural state is painful. Whence the chill is one and the same in amount; but now it pleases, now it gives pain. If it should come upon an overly-heated body, it is entirely pleasant; for the body suffering immoderately from heat is soothed by the entrance of the missing chill, and is pleased since it is soothed. If, however, you should suddenly chill the body under normal conditions, you would suffer, for the body will suffer from the unbalanced temperament. For as Hippocrates said, pains occur to those changed or corrupted in nature.[52] Hence it is not only necessary for the chill to be sudden and vigorous for rigor to arise, it is also necessary that the affection be violent, that is, unnatural; and so rigor is a sudden chill that produces an unnatural state. And, if one is to be accurate, especially in regard to the origin of the affection, it seems to me to be necessary to persist in the view that in rigor there occurs a sudden and violent chill of the innate heat. For example, the heat is chilled both when it dissipates, as the *tonos* that pervades the body begins to fail, and when the heat lacks the nourishment
621] from which it was kindled; but neither of these two affections itself[53] causes rigor, or else everybody would suffer rigor when dying. Hence, loss of heat is in a way common to all who die, but they do not suffer rigor; for I am not

48. As the argument runs smoothly without it, we regard the following passage, which is found in V at this point but omitted by B and Arn., as an intrusive gloss: "Further, it is necessary for the chill to be vigorous and forcible, in order that the definition be clear and true ⟨viz.⟩ :rigor is sudden, violent chill of the innate heat."

49. Plato, *Tim.* 64d.

50. After ψύξεως V has εἶδος.

51. Plato, *Tim.* 64cd.

52. Hipp. *On Places in Man* 42 (VI 334.7-8 Littré), slightly altered.

53. αὐτῶ VBa αὐτοῦ bck αὐτὸ Durling, whom we follow.

saying simply that it is necessary for the heat to be chilled, but that it must be chilled *suddenly* and *violently;* that is, the heat itself remains strong, weakened in neither substance nor *tonos,* but affected by an external cause.

Consider with me flames, which may be (1) sometimes extinguished by a lack of the external material from which they were kindled; (2) sometimes withered away in the brilliant sun; (3) sometimes quenched by much water; and (4) sometimes smothered when too much wood has been piled on. These four things quench flames in four different ways: the *tonos* of a flame withered in the sun (=2) is dispersed, dissipated by the violence of the surrounding atmosphere, for the strength of the sun's rays is stronger and more enduring than fire. Whenever for lack of material it is no longer kindled (=1), it is extinguished since its substance is lost. For that which is kindled is continually dispersed as it moves outward; tending inwards for
622] the sake of nourishment but finding none, it stretches out for a second time, now rather weakly. A flame oppressed by a quantity of matter (=4) and deprived of breath is stifled. Discussion of the harm done by water (=3) is hardly necessary; for the battle between flame and large quantities of pure moisture is so vigorous that even if you apply oil to flame suddenly, a hissing noise and some agitation must needs occur, the fire displaying its own violence with what seems to be its own voice.

Consider then that rigor is such an affection of the innate heat [i.e., is like (3)]. For you will not find rigor occurring when the warmth decays, unnourished for lack of material (=1), nor when oppressed by the amount of material (=4), nor when becoming weak it abates (=2); rather, it occurs when although strong and able to extend itself it is checked. It is for this very reason that confusion results in the body, a twofold combined motion occurring here, as in the tremulous, but for another reason. For there the mixed motion arose due to the weakness of the force moving the body, to
623] the extent that the movement raising the member lacked *tonos*, part of the body always slipping downwards. In this case the natural motion of the heat is forcibly checked, and rigor occurs. For since the motion of the heat has been weakened neither in substance nor *tonos*, it tries to extend and carry itself to all of the body; but hindered and forcibly pushed into the depth, it falls back to its own source. Not being able to remain there — for to rest is death for constantly-moved substance — gathering itself and as it were coiled up, it does not extend itself evenly within along a path of no resistance, but rather, using a violent motion, and as it were springing from the starting gate, it sometimes opposes those opposed to its motion forwards, eager to push them aside, and clear the way for itself. Striking against them, it is necessarily checked in its rushing motion, and the whole body shakes at the impact. The chief result of this is that the heat having become vaporous, in colliding with what opposes it, it rebounds back inward

suffering something like a blow and for the second time comes back to its
624] source; thence set in motion again, it attacks more violently, again rebounds with this impact; and this often happens in succession, as long as the distressing causes remain.

Because of this, therefore, the affection is painful, for the body is distressed by the blows, and the motion produced by the two motions just described moves the animal irregularly. For when it is in the natural state, our inborn heat enjoys even and unhindered passages, drawing itself together in an appropriate measure of motion, then unfolding. In rigor the motions are neither drawings-together nor unfoldings, but you might more justly say that when going inwards (I will use not my own words but those of the ancients) it *rushes down,* is *compressed,* is *repulsed,* and *runs together;* when moving outwards, it *breaks out,* is *shaken, bursts out,* and *leaps out.* For these latter words of the ancients are also all appropriate and describe the affection in question as clearly as possible. I say the disturbance of everything in the body, its shaking and agitation, and every irregular, disordered, unwilled motion in rigor is produced by the irregular, vigorous,
625] and violent impacts and shakings of the innate heat that has become vaporous. Because of this the body is hotter in rigors than in its natural state, and sweat is also produced, for whenever the heat after many impacts has pushed its way completely through that which has been causing distress, and can now breathe freely, the body must necessarily be heated. There are three reasons for this: (1) often the heat, shut off from exhalation, is gathered into the depths; (2) the heat that is now outside has been very much attenuated; and (3) owing to the impacts, blows, and violent motions, the heat is naturally kindled. By rubbing wood or stone you will sometimes produce fire. Since the innate pneuma is hot by nature, will it not — if it happens to be moved violently — be kindled all the more? This in fact is clearly to be seen in natural motions, how men running and wrestling and being rubbed, and those moved in any other way, are warmed no less than if they were heated by the summer sun or by the fire. Often when the heat makes its way up from the depths as I have described, as if in a boil, it
626] suddenly pours forth something of its moisture; and this we call sweat. In rigor, therefore, it is painful not to warm up after being chilled; for the heat has been beaten in the fight. It is beaten when conquered by the force of the afflicting cause, or when it happens itself to be weaker. Hence this too is said: "speechlessness from rigor, not warmed up again, is bad."[54]

54. Hipp. *Prorrh.* I 65 (V 526.7-8 Littré). ἀφωνίαι VBab Arn (ablatio vocis) καταψύξιες ck Hipp. Cf. Hipp. *Epid.* III 17 γ_1 where Pythion suffering from rigor and fever is said to experience speechlessness as one of his symptoms.

(Moreover, teaching us of each of the dispositions in which rigors become fatal, he will (later) say: "when there is twisting of the eyes in a wearying fever, rigor is fatal."[55] In this case, rigor is born of a strong cause. In another, it is fatal because of the weakness of [the body's] strength: "If rigor should attack during a non-intermittent fever, when [the body] is already weak, it is deadly."[56] But concerning these things more has been said elsewhere.)

Is rigor due to a cold cause or a warm?

Now we shall consider whether virtually everyone is correct in attributing rigor to a cold cause. That the condition is cold is manifest; but whether the agent causing it is also cold seems to me to be worthy of investigation. Now rigor more than anything else is a sign of a precise tertian fever. The paroxysms attack with vigorous rigors, and yet not even a
627] madman would say that such a *fever* is created from a cold humor. For it is an ardent fever in genus, falling short of a continuous ardent fever in that the heat of the fever (both flaming and scorching) is intermittent. Insatiable thirst, the desire for chill, the vomiting of pure bile, and listlessness concomitant with vomiting, how are they not all clearly from superfluous heat? How then do patients suffer rigor in tertian fevers? How is it that in continued ardent fevers, when they are not intermittent but attack with continuous burning, rigor supervenes on top of the fever, and in fact marks the crisis of the fever? He [sc. Hippocrates] says: "For there is relief for him afflicted by ardent fever, when rigor supervenes."[57] Moreover, a bitter and warm drug applied to a wound will first cause pain; then it brings about a shivering and then rigor on top of the shivering; we have in fact known many to suffer rigor and fever from wounds that have been irritated by bitter drugs. It is necessary too that phlegmon on the point of abscess be associated with rigor and shivering. I would have reminded you also of many
628] other dispositions, in which rigor clearly is created by bitter rather than by cold humor, were I not hesitant to lengthen the discussion. Let us not therefore force the matter and associate rigor with cold alone, since even a frightful tale or spectacle sometimes brings on shivering and rigor.

Not only Hippocrates but Plato too recognized this, for in discussing the illnesses arising from yellow bile, he mentions rigor too. Therefore, while I have cause to marvel at the physicians coming after Hippocrates and Plato for many other reasons, I marvel not least at their words concerning rigor.

55. Hipp. *Prorrh.* I 89 (V 532.9-10 Littré).

56. Hipp. *Aph.* IV 46(IV 518.10-11 Littré); cf. XVII B 724-5.

57. See above, n. 36.

For is it not strange that Plato, though not a physician, was aware that rigor sometimes arises because of bile, and earnestly sought the cause, while *they* are so far from complete knowledge of this that they do not even know that rigor arises both because of bile and because of any sort of bitter humor?

But it is difficult to discover how an affection that is cold should be constituted from a humor that is bitter and warm. (Or perhaps it is not difficult, if in fact even Plato was in no doubt.) It therefore would be much better, even if it is really difficult, not to attempt to refute a fact clearly
629] evident, but to agree that one is ignorant of the cause. To deny what is evident would be like our agreeing that we do not see, simply because we do not know *how* we see. Therefore it is as true as anything that rigor arises from bitter and warm humor no less than from cold and congealing humor. Then we must see if all it takes to bring on rigor is for the cold or the bitter to be in excess. Let us[58] next establish that, despite what many people think, rigor arises neither simply from excessive cold humor nor simply from excessive bitter humor. As far as the cold is concerned, I have demonstrated this plainly above, referring to all conditions of edema, numbness, paralysis, and dropsy; I shall now demonstrate this to you in the case of the warm and the bitter, for the evil-humored, the icteric, the sharply feverish, and those suffering ardent fever would then all suffer rigor.

Other factors in the production of rigor

Hence it is not necessary simply for a cold or bitter humor to be in excess for the creation of rigor; rather, it is necessary for there to be some special circumstance in each case. This might be — for those who love the truth must not shrink from following their discussion to its conclusion — either
630] the quantity of the excess, or the quality of the humor, or some place of the body in which it is necessary for this to be collected. And whether it is static or mobile, and if so how it moves, makes no small difference. Even Plato, looking into these very same matters, said:[59] "Since the fibrin possess this faculty in the blood, the bile (which has naturally come from old blood and has melted away into blood again out of flesh) enters hot and liquid at first gradually, and is congealed by the action of the fibrin. As the bile congeals and is forced to give up its heat, it produces internal chill and trembling. When the bile enters in too great a flow, it overcomes the fibrin by its own

---

58. διορισώμεθα V Arn.-όμεθα Bk

59. Plato *Tim.* 85d. The faculty referred to in the first clause is the ability of the fibrin (ἶνες, usually in Greek used of sinews) to maintain the mean between excessive thinning and thickening of the blood. Cf. Aristotle *Parts of Animals* II 4 650b 14-16; *HA* III 6 515b 27-31.

heat, and, boiling, scatters[60] it in disorder." In this passage Plato has attempted to describe all those things that it is necessary to know in every kind of illness. For he spoke of the form of the humor ("bile"); he also indicated the quality ("hot and liquid") and then the origin of this sort of bile, for he said that it arises from melting flesh. But he also added the place
631] into which it flows when he made it clear that the entering bile is congealed by the fibrin contained in the blood. The genesis of the affection has been included in this passage, where he says that chill and tremor arise, calling the perception of cold in rigors "chill" and irregular shock and agitation "tremor" (in which respect we say not only Plato but many physicians as well have gone wrong; the motion arising in tremor has been distinguished above by us from that of rigor). Then, he says, when the bile enters the blood in an increased flow and overcomes the fibrin, it heats the body to the extent that it can, effecting a change in the fibrin just as the bile itself was altered by the fibrin immediately before. As to whether or not the things Plato said are true, this is not now our task to consider. (I intend to write a critical commentary on the *Timaeus*.[61]) But that he omitted nothing of what should be said about rigor is clear from his words. For he named both the humor from which rigor derives and the place into which it flows and the form of the motion, and in addition the manner in which the body is chilled and then heated.

632] In the future, then, we shall examine the views of Plato in our commentary on the medical teachings of the *Timaeus;* now, however, we are putting forward our own opinion, explaining what was said a little above according to the teaching of Hippocrates. For sometimes shivering alone follows the application of hot drugs, but often rigor does as well. The same thing happens in ardent and tertian fevers, when yellow bile moves not in the hollows of the vessel, but through the flesh, the rigor arising either by the greater production of this humor in the flesh, or by a natural purgation through the flesh. Ardent fevers differ from tertian fevers in this alone, that the ardent fevers have the bile in the vessels, while in tertian fevers the bile is outside the vessels, moving through the sensitive [i.e., perceiving] bodies. For in its motion through them, irritating by its bitterness, it causes pain. It happens therefore that in this case two motions occur: (1) the blood inclines into the depths of the body, whose outer parts are consequently chilled; and (2) the very parts of the body containing the

60. We read ζέσασα with *Tim.* (δείσασα B δήσασα V), and διέσεισε with *Tim.*, ms. F. (διέσωσας B διέσωσεν V *Tim.*, mss. AY).

61. This is the Περὶ τῶν ἐν τῷ Πλάτωνος Τιμαίῳ ἰατρικῶς εἰρημένων *On the Medical Sections of Plato's Timaeus)*, the fragments of which have been collected by H.O. Schroeder and P. Kahle, CMG Suppl. I (Leipzig 1934).

633] bile push it from one part to the next by virture of the body's eliminative faculty, which expels foreign material, until the bile driven from all parts of the body is secreted through sweat, vomit, or through the bowels. This also happens to those who have suffered indigestion or those who are filled with evil humors, or those who come into the summer sun or the bath, or those exercising. Such people at once begin to shiver, and some of them suffer rigor too. For it is not only necessary that the cause be something mordant in us, but also something in violent motion, if it is to bring about rigor. And it happens to be common to both kinds of causes, hot and cold, that they produce painful motion in the body.

And because of this, rigor makes inroads in quartan and tertian fevers, even though they arise from humors that are contrary to one another (the black bile is cold, while the yellow is warm). I did not say it is neccessary that they be simply in excess in order to bring about shivering or rigor, but that
634] they must also move rather vigorously through the perceptible bodies. In this case the blood inclines into the depths of the body and to the viscera, and with the blood obviously the warmth as well, while both the skin and the extreme parts of the legs and hands become cold and bloodless, because they are most distant from the viscera. If it should happen that the innate heat is extinguished in the depths, either because it is stifled by not being dispersed as vapor towards the external part, or because it is completely overcome by cold causes, the animal dies; but if the heat converges in the depths, and, gathering strength, holds out against the antagonistic causes, it acts in this case like an agent of that faculty present in every part of the body, i.e., the eliminative faculty. For since this has already been designed to expel hurtful things by itself, it does this all the more with the heat moving up from the depths, which by the force of its motion helps cast out the painful elements along whatever path is easier for it. Often then it casts out the hurtful things through the skin, and often too in vomitings and through the bowels.

Rigor is likely to arise not only from yellow or black bile, but from very cold phlegm as well; Praxagoras calls this the glassy humor.[62] But such rigor
635] is not vigorous, even though it sometimes persists for several days in succession; when the patient is quiet and not moved for any reason, it too is quiet. But when the patient is moved, it immediately follows with a force proportional to the measure of the motion: more vigorously with the stronger and intense motions, more sluggishly[63] with the weak ones. I have

62. See Praxagoras, fr. 51 Steckerl, for other references to glassy humor.

ηχυ

63. βραδύτερον V βραχύτερον B edd.

seen this symptom appearing in women more than men, especially to women who live a very inactive life (and who take baths after meals). I also saw it happen to a certain youth among my schoolmates in Alexandria, when we first put in there in the beginning of autumn. For several days in succession he ate a number of soft, fresh palm fruits, before and after the bath; many of them were not perfectly ripe. It first struck him when he began to shiver violently after exercise and bath, because of which, thinking he would have a fever, he lay quietly, under a cover of cloaks. Since he was without fever when the night had passed, he got up at dawn for the usual things; but the shivering recurred at this, so again he lay down and was quiet
636] until the hour for the bath. As he stood up in order to go to the bath the shivering arose more strongly, already displaying something of the symptoms of rigor. Then, thinking that he would be completely feverish, he kept himself quiet still longer. When, testing himself through the whole day and the following night, he found himself shivering after moderate motions, and suffering rigor from more active motions, he took my advice as to what was to be done. By telling him of a similar case (a woman in my part of Asia Minor), I made my companion less fearful, and I urged him to use warming foods, drinks, and drugs, which would cut the thickness of the humors; in this way he returned to health. After that I gave at the outset to those suffering similarly the drug made from the three peppers, next my drug made from calamint, and then the compound from Cyrenaic juice and castoreum, which is also very beneficial for quartan cycles, and especially whenever the patient is chilled by vigorous rigor.

637] Do not be surprised, however, to find it written in the ancient physicians that fever necessarily follows upon rigors without chill which derive from the same disposition in the body. For nothing such as this happened to the ancients, who neither took so many baths after meals nor led an inactive life. Today both these are common, giving rise to this rigor called "anekthermantos" ["not to be warmed"], a new and strange symptom, owing to our new way of life. In all those suffering in this way there arises a sensation either of tension or of weight in the right hypochondrium where the liver lies, obviously because the veins at this place are blocked by the grossness of the humors. Just as the patients have a feeling of weight and tension in the viscera, so too they perceive a rigor different from that in quartan and tertian fevers. For they say that the rigor that arises in quartans is just like the chill they experience when they travel in extreme cold. But in tertian and ardent fevers alike they often feel prickling in the flesh, just as if
638] they were being stung by fine sharp darts. I myself have had no experience of quartan rigor but have experienced the other sort, having been feverish four times in youth with a tertian fever and once with ardent. Hence I can bear witness to the aforesaid quality of rigor in such affections. Those who

have experienced quartan rigor say it extends right to the bones when it is vigorous, being like those rigors which arise from very cold outside air. And I can add the following to tertian and to ardent fevers, something not found in quartans: the majority thirst and feel warm in their viscera at the very time they suffer rigor, neither of which is true in those suffering rigor in quartan fever.

Spasm

Since we have said enough about rigor, it remains to discuss spasm. The discussion will be neither long nor obscure, if one keeps in mind what has been said earlier. I will now begin with a reminder of what I explained in my
639] work *de Motu musculorum*.[64] Since all the voluntary motions are effected through the muscles, whenever the muscles, drawn up to their heads, draw with themselves each of the parts into which they are inserted, and when a condition arises that produces tension in the muscles, then a motion that looks natural but is involuntary follows this, and this condition is called spasm. The muscle is stretched and drawn towards its own source, just as that very part of the body where the muscle has its insertion is drawn towards the muscle. This is common to the healthy and to the spasming; but is involuntary only in the abnormal, not the healthy. If then we should ever find for how many reasons the sinews are extended, our discussion would be finished. In fact, it is not possible to find anything outside the body more like a sinew than those chords which we see daily stretched by the craftsmen in lyres and citharas whenever they are going to use the instruments, but
640] slackened whenever they are finished and put them away. For they break in the intemperate mixtures of the atmosphere, becoming moist in wet and damp weather and strongly dried out in dry and wintry weather. Hence, because of this, they slacken the strings when they put the instruments away, especially whenever the atmosphere is such as I have said, for either way they break if kept stretched. Consider, pray, that the *neura* and the tendons in the bodies of animals, whether distended by excess moisture or dried out by drying causes, are brought into as great a tension as that which in the healthy produces voluntary motion. Consider too that it is possible for one of the parts in the body, severely afflicted either through phlegmon or through some other cause, to draw the attached *neura* along with itself.

It is by considering all these dispositions that you will find the origin of spasm. For phlegmons of the neural parts, especially when produced at the origins of the nerves or near them, stretch and pull the contiguous sinews, just as the craftsmen stretch the chords of an instrument. And if the sinews

64. IV. 367-464.

641] should be stretched, swollen by an excess of humors, a condition arises in this case similar to that in which, because of the moisture of the atmosphere, the chords are strongly stretched. The opposite is seen to occur in malignant ardent fevers and severe frenzies; for just as thongs which dry out by lying close to a fire are drawn together and tightened, in the same manner spasms arise from an excessive dryness caused by disease, which strongly dries out the sinews. This happens in ardent fevers due to dryness alone, but in frenzies the symptom is due also to a phlegmon at the origin of the *neura*. You already know that all agree that one form of this pathos is forward-pulling and is so called ["emprosthotonos"], one "backward-pulling" ["opisthotonos"], and one tetanos. Whenever the parts of the body are stretched forward, it is emprosthotonos; whenever backwards, opisthotonos; with equal force in both directions, tetanos. You will not heal spasms caused by dryness, for such victims will die first, without giving you
642] a chance even to think of a medication for them. Such spasms as arise from excess or from phlegmon you may cure by evacuating the excess, or by entirely curing the phlegmon by the remedies proper to it, which you have learned in my work on therapeutic method.[65]

Michael McVaugh
Department of History
University of North Carolina
Chapel Hill, North Carolina 27514

David Sider
3873 Orloff Ave.
Bronx, N.Y. 10463

65. This is a reference either to *de Methodo medendi*, book XIII (X 874-944) or to *Ad Glauconem de methodo medendi*, book II (XI 71-146); cf. Ilberg, p. 178 (=73 of reprint).

The Legacy of Carl Jung*

FRED B. ROGERS

THE ideas of Carl Jung, embodied in his analytical psychology, have gained many adherents since his death at age 85 in 1961. Jung's concepts of human personality, man's spiritual nature, dream life and soul journey have permeated art and literature as well as psychology and psychiatry. He travelled widely during his long life; varied experience led him to postulate a collective or group, as well as an individual unconscious mind. Like Artemidorus and Freud before him he compiled a dream book of broad scope and color. To Jung, the unconscious mind was a repository of the wisdom of the ages.

Dr. Jung's writings are discursive and not easy reading, but they reward those who think about them. The collected works of Carl Jung have been published in twenty volumes by Princeton University Press. Abstracts of these prolific writings were issued by the National Institute of Mental Health in 1978. The C.G. Jung Institute at Zurich, Switzerland, continues his work there and Jungian centers are active in London, New York, Chicago, San Francisco, and elsewhere. A quarterly, *Journal of Analytical Psychology,* is published by the Society of Analytical Psychology in London, England. The International Association for Analytical Psychology, based in Zurich includes affiliated societies in America, England, Switzerland, France, Italy, and Israel.

The son of a clergyman, Carl Gustav Jung was born and reared in Switzerland. After medical graduation from Basel University in 1900, he interned at the Bürgholzli Asylum in Zurich under Dr. Eugen Bleuler. Early in this century Bleuler introduced the term "schizophrenia" to denote a diverse group of mental disorders, and disproved the generally accepted idea of their incurability. Jung's interests in the mind next took him to the Salpêtrière in Paris, where he worked with Dr. Pierre Janet — a pioneer in medical psychology. Jung devised a useful word-association test during this period.

In 1906 Jung became a disciple and friend of Sigmund Freud, the foremost psychiatrist of his time. After a few years, however, he developed diverging views and in 1913 broke away from Freud and founded the school of analytical psychology. Jung took a more philosophical approach to human personality than did Freud. Art connoisseur Paul Mellon, whose first wife, Mary, was a patient of Dr. Jung, said, "I think that Jung was more of a philosopher than a physician. I have always felt that his ideas were very intellectual and a little bit separated from life." Although Jung did not permanently cure Mary's asthma, Paul was nevertheless impressed enough to name a foundation after Bollingen, Jung's

*Read at Temple University, April 2, 1979.

retreat on the Lake of Zurich. The foundation subsidized the publication of Jung's writings and other scholarly works.

Among Jung's contributions to the field of psychology was his explanation of the psyche in terms of three systems that interact with each other. These are the conscious, the personal unconscious, and the 'collective unconscious.' The last was of importance in explaining the meaning of dreams, for Jung claimed that all the world's people share archaic notions and symbols which are expressed in eternal themes. These he called 'archetypes.' Jung was much interested in mythology, alchemy, astrology and occult matters. During the twenties and thirties he made trips to Africa, Asia, and the United States to gather information and inspiration for his numerous books and essays.

Jung visited the United States several times. In 1909, in company with Freud and other seminal thinkers, he participated in a prestigious gathering at Clark University in Massachusetts and received an honorary degree. Jung returned three years later to deliver a series of lectures on psychiatry at Fordham University in New York. In 1925, he visited New Mexico in an attempt to decipher the thought patterns of American Indians, and toured the Delta South to observe Black Americans there. (Jung noted the psychological impact of our red and black citizens on general American culture.) In 1936, Carl Jung and his mentor Pierre Janet were awarded honorary degrees at Harvard University's Tercentenary Celebration. During the following year, Jung presented the Terry Lectures at Yale University; these were published as *Psychology and Religion.*

The psychoanalytic milieu of Zurich attracted numerous American students to Jung's camp. The Zurich Psychological Club, formed in 1916, preceded the present C.G. Jung Institute for Analytical Psychology which was founded in 1948. F. Scott Fitzgerald, in his poignant novel, *Tender Is The Night* (1934), had its hero, Dr. Diver, reflect on the personalities he might encounter at a psychiatric congress: "Articulate among them would be the great Jung, bland, super-vigorous, on his rounds between the forests of anthropology and the neuroses of school-boys."

Several brilliant women became disciples of Carl Jung. Cary F. Baynes (1883-1977), a 1911 graduate of the Johns Hopkins Medical School, was a close associate who translated books on analytical psychology and Chinese philosophy. During the 1920s and 30s, she translated several works by Jung, and later Richard Wilhelm's German version of the Chinese oracle book, *I Ching, or Book of Changes.*

Dr. Cary Baynes also translated with a commentary, *The Secret of the Golden Flower,* an abstruse Chinese treatise on inner harmony. Her husband, the British psychiatrist H. Godwin Baynes (1882-1943), translated Jung's major work, *Psychological Types* (1923), and in 1925-26 joined Jung on an expedition to East Africa.

Four women psychiatrists, Drs. Kristine Mann (1873-1945), Beatrice M.

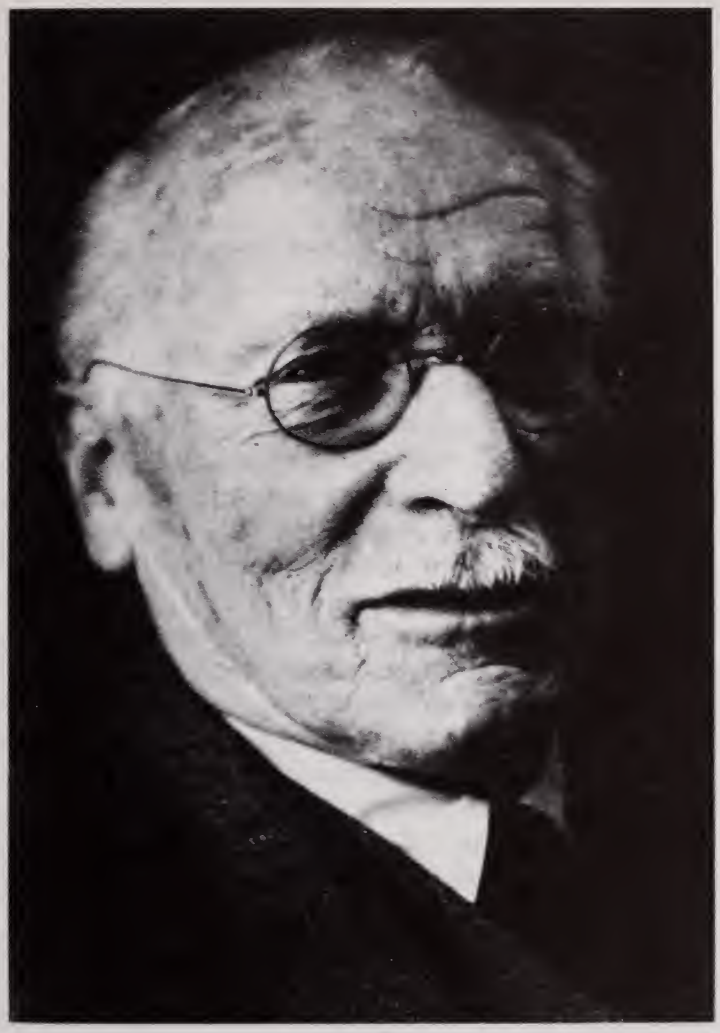


Fig. 1. Carl G. Jung

A three-part color motion picture, *The Story of Carl Gustav Jung,* narrated for BBC television by writer Laurens van der Post, is obtainable from TIME-LIFE Multimedia, 100 Eisenhower Drive, Paramus, N.J. 07652. Each half-hour segment documents a phase of Jung's career: *In Search of the Soul, Sixty-Seven Thousand Dreams, The Mystery That Heals.* A teacher's guide, compiled by Marilyn Singer, accompanies this film series.

Hinkle (1874-1953), Eleanor Bertine (1887-1968), and M. Esther Harding (1888-1971), were among the founders of the Analytical Psychology Club of New York in 1936. Devoted to professional training and psychotherapy, the Club's library is named in memory of Dr. Mann. A periodical, *Spring: An Annual of Archetypal Psychology and Jungian Thought,* has been issued yearly by club members and colleagues since 1942. Dr. Hinkle translated with an introduction Jung's *Psychology of the Unconscious* (1916/1927), and wrote a constructive volume, *The Re-creating of the Individual* (1923/1949). *Human Relationships*, a treatise written by Dr. Bertine, appeared in Swiss and American editions (1957/1958). Dr. Harding's perceptive book, *The Way of All Women,* first issued in 1933 and revised in 1970, is now available in a paperback edition. Frances G. Wickes, another founder who was a child psychologist, wrote *The Inner World of Childhood,* a book initially published in 1927. In her revised edition of this work (1966) Mrs. Wickes said: "The winter of 1923 found me in Zurich, and my hours with Dr. Jung opened the door to a new understanding of life. This understanding, reinforced and reillumined by many subsequent visits to Zurich, I hope is still growing in this my ninetieth year, and for this I am increasingly grateful to Carl Gustav Jung."

Jung introduced terms and theories which have stimulated much discussion and writing: archetype, complex, extrovert, introvert, anima and animus, individuation, self, persona, and shadow. He suggested that the French word *énergie* replace the word *libido* to denote the general life urge whose sphere extended far beyond the force of sexual instinct. Jung's books are now widely available in paperback form. The best introduction to his thought is his autobiography, *Memories, Dreams, Reflections,* which appeared during the last year of his life. From there one can move on to his multi-volume *Collected Works.* Colman McCarthy, columnist for *The Washington Star* (D.C.), has observed: "Although Jung wrote in the earlier part of this century, his thought applies to this morning's front page....Followers of Jung — whether Jungian analysts, teachers, students, or patients —are a passionate bunch, and no outsider should mention the master's name without bracing for a stream of stories and remembrances.... Few who ever read a little of Jung ever fail in time to read a lot."

Last year, Dr. Robert F. Freeman spoke about using classifications proposed by Jung to develop a screening system that forms the basis of his book on personality and conflict. Not separated from life, this system stemmed in part from his work as a prison physician at Carson City, Nevada. Stating his opinion in the *American Medical News* (June 9, 1978), Dr. Freeman said of Carl Jung, "His is the psychiatry of tomorrow."

Temple University School of Medicine
Philadelphia, Pennsylvania 19140

Studies on Hippocrates and Galen in Modern Spain

LUIS GARCÍA-BALLESTER

THIS paper attempts to trace the evolution of studies on ancient medicine during the last two hundred years, specifically from the time when traditional medicine, in which the writings of Hippocrates and Galen still played a leading part, entered into a crisis. The move towards modern medicine caused an obvious repercussion on the reputation of the ancients. With the passing of the eighteenth and nineteenth centuries, doctors ceased to consult the collected works of Hippocrates and Galen as though these authors formed a kind of bibliographical compendium of contemporary literature, but began instead to consider them an object of study to which the methods of history could be applied. From that moment onward these classic physicians demanded adequate treatment. Naturally, such treatment was omitted and attempts were made to manipulate the work of these authors for different purposes. Indeed, as we shall see, during the last two hundred years in the history of Spanish medicine there have been insufficient approaches to the work of the great physicians of antiquity. For example, some have urged that the classics should be forgotten in the name of immediate practicality. Others have considered that recourse to the classics is justified only when they can be made to yield specific precedents. Still others have used the classics (which are defenseless) as a shield against the advance of science, and have attempted by this method to stay the course of history or to justify a special scientific policy.

It is possible to distinguish five different phases of the relationship between modern or contemporary Spanish medicine and ancient medical authors. (1) The first phase ends when Greek ceased to be used by physicians. This occurred between the 60s and 70s of the eighteenth century. (2) The second phase is characterized by rejection of the medicine of Hippocrates and the perceived necessity to replace him by the new models. We can date this phase as having ended in the year 1801. (3) The third phase was a sign of regression — supported by the scientific policy of the Spanish government — which converted a return to Hippocrates into an attitude set up in opposition to the scientific and natural approach to the disease introduced by the new positivism. The peak of this phase coincided with the reign of Ferdinand VII (1812-1831). (4) The fourth phase evolved very late, at the end of the nineteenth century (1899), with the work of Donaciano Martínez-Vélez who considered the *Corpus Hippocraticum* and the writings of Galen to be classics and approached their study by the objective academic methods of history and philology. At the same time, by means of correct Spanish translations, he attempted to restore Hippocrates to modern physicians. (5) The fifth phase began in 1941 with the studies of Pedro Laín on ancient medicine.

Until the end of the eighteenth century and the beginning of the nineteenth, medicine throughout Europe maintained close links with philology, since the latter provided the necessary instruments in Greek and Latin for the study of some medical texts which, although far removed in time, were still valid for the most part in their contents, especially in that which we might describe as clinical empiricism. In Spain, this attitude became firmly entrenched in 1640, when, during the reform of the famous university college of Alcalá (the Tri-lingual College) it was insisted that "the Greek language and no other" should be taught to those who wished to study medicine "because they need this language to understand medical authors who wrote in Greek, such as Hippocrates, Aristotle, and others." This situation continued on the same bases of evaluation until the second half of the eighteenth century. Andrés Piquer (1711-1772) is the last example of the great physicians of the Enlightenment for whom Greek represented a basic working tool. In 1750 he wrote:

> I want to learn the Greek language because I feel its need very greatly for my studies.[1]

and he referred explicitly to "the most classic of the Greek authors of the field of medicine."[2] Almost twenty years later, in 1769, in the prologue to the second edition of his translation of Hippocrates' *Epidemics,* he wrote:

> I have removed the Greek text, with the recommendation to those who understand this language that they read Hippocrates in the original version.

The second phase was characterized by rejection of ancient medicine and its most characteristic authors, Hippocrates and Galen. The nature of the reaction of modern medicine caused the writings of Galen to be rejected and to be considered invalid. Those writings of Hippocrates that are characterized by clinical empiricism and therefore are closer to more modern clinical attitudes were also cast aside. This latter kind of rejection is exemplified by the Catalan clinician, Francisco Salvá y Campillo (1751-1828), who in 1801 ceased to consider Hippocrates and the Hippocratic case histories as useful models. He answered in the negative the questions which he himself had posed:

> Shall we propose [the Hippocratic case histories] as a model which the young medical staff should follow in their description of disease?...

---

1. A. Piquer, *Las obras de Hipócrates más selectas, con el texto griego y latino puesto en castellano, e ilustrado con las observaciones prácticas de los antiguos y modernos para la juventud espanola que se dedica a la medicina* 3 vols. (Madrid, 1757-1761-3 vols.): 1 *Pronósticos;* 2-3 *Epidemias* (2nd ed. 1769-1770, 3rd ed. 1774-1781, 4th ed. vol. 1 1788. French Translation, Montpellier, 1882).

2. V. Peset, "Un erudit i un metge: Gregori Mayans i Andreu Piguer," in *Gregori Mayans i la cultura de la Illustració* (Barcelona-Valencia, 1975):229-393.

> The case histories which are described in this school [in Barcelona] have to be more precise and more detailed than those of the first father of medicine.[3]

Opposed to Hippocrates, he suggested that the models be modern authors such as Stoll and other members of the Old Vienna School. At the same time he proposed that autopsy protocols should be included in the curriculum; this was very much in line with the new anatomo-clinical way of thinking that characterized the Paris school. Hippocrates and ancient medicine in general, fell into disuse consequent on the qualitative change in European medicine and on scientific publication.

As is well known, scientific activity in scientific and medical communities is sensitive not only to the internal laws of scientific production but also to numerous external factors. In Spain, it was basically a result of these external factors that such a long time elapsed between the rejection of Hippocrates as a useful author (1801) and his consideration as a classic (1899-1900) and hence as an object of study for historians and philologists. In Spain, the study of Greek medical texts (the *Corpus Hippocraticum* and the works of Galen) as classics was undertaken for the first time by Donaciano Martínez-Vélez (1899).

What happened then, in Spain, in the hundred years between the work of Salvá and that of Donaciano Martínez-Vélez?

Unfortunately, there was no line of continuity which could connect the different attitudes exemplified by these two men. Between the two lies the great trauma that modern Spanish medicine suffered. I refer to the break with the achievements of the Enlightenment which signified the introduction, acceptance, and elaboration of modern science from the end of the seventeenth century and throughout the whole of the eighteenth century, to the lack of scientific connection with Europe, the paralysis of medical and scientific journalism, the disappearence of scientific institutes, and the exile of scientists. The years 1812 to 1831, which follow the war of Independence and include most of the reign of Ferdinand VII, mark the height of this era of complete disaster.[4] Most significantly this period produced an affirmation of the writings of Hippocrates, especially of the *Aphorisms* and the *Prognostics,* both of which were compatible with the purest of scientific conservatism. The use of Hippocrates as a modernist was defended with official protection and was prescribed in the plan of studies for faculties of medicine and surgical colleges. In addition, the use of Latin was approved for exposition and commentaries of the Greek. This is exemplified by

3. F. Salva, *Exposición de la enseñanza de la Medicina Clínica en el Real Estudio erigido por S. M. baxo la dirección de la Real Academia Médico-Práctica de Barcelona. Año MDCCCI* (Barcelona, 1802).

4. J. M. López-Piñero, "El saber médico en la sociedad española del siglo XIX," in *Medicina y Sociedad en la España del siglo XIX* (Madrid, 1964): 31-108.

D.A. Vallejo (1827). To these circumstances we owe the appearance of the translations by Manuel Casa Aguado (1818), Ignacio Montes (1827-1828), Francisco Bonafón (1830), and Tomás García Suelto (1830). All these men were opportunists, who translated Hippocrates from Latin or French with the commercial spirit of speculative booksellers. Between 1840 and 1850, official protection and the influence of the French vitalism (which was completely ruined and bookish in its Spanish version) converted "Hippocratism" into a refuge for conservatives opposed to the new positivistic methods and to the so-called scientific-natural approach to disease. Added to this was the influence in Spain of the work of Littré (1839-1861). The consequence of all this was the large number of translations of Hippocrates which appeared during these years. Most significantly, all of these are of low accuracy and limit themselves to the *Aphorisms* and the *Prognostics,* which were official textbooks in Spanish faculties of medicine during the first forty years of the nineteenth century.

But the slump which was produced in Spanish science and medicine during the disastrous reign of Ferdinand VII was beginning to be overcome precisely around the time of the forties when, amongst other events, the return of exiled liberal scientists introduced new methods of work. Thereafter a lukewarm yet real labor of scientific institutionalization and liberation began. It was exemplified in the new growth of medical journalism. Perhaps the most interesting novelty, from the methodological point of view, was the introduction to the positivistic method. This produced a severe, polemical confrontation between those who supported traditional clinical medicine and vitalism, and those who defended the new method of clinical training and the doctor-patient relationship. The former group took refuge in Hippocrates and converted his writings — especially the *Aphorisms* and *Prognostics,* as already mentioned — into a bible of this near-religion. At the same time they accused the others of dehumanization and of a break with sacred medical tradition.

This posture was maintained by Tomás Santero, Francisco Rubio, Francisco Méndez-Alvaro, Juan Drumen, and Matías Nieto-Serrano. Their opponent was the ardent positivist, Pedro Mata, the man who introduced a new system of legal medicine into Spain and who advocated a break with traditional medicine, represented in the vitalism of Hippocrates. Mata recommended to his opponents that, instead of reading Hippocrates, they should read Johannes Müller, Karl F. Burdach, and Claude Bernard.

Unfortunately, none of the contestants approached the *Corpus Hippocraticum* with any degree of accuracy. I have already pointed out the purely commercial and opportunistic nature of the translations of Hippocrates, very similar to that which was manifested in the same years (1812-1833) with the publication by C.G. Kühn in Leipzig of *Medicorum Graecorum Opera Quae Exstant* containing Latin versions of the printed Greek texts of the works of Galen and Hippocrates.

Littré's work did not act as a stimulus to impoverished Spanish philology.

Moreover, the writings of Spanish medical historians, such as A. Chinchilla (1841-1846) and A. Hernández-Morejón (1841-1852), had still not moved past the stage of historical construction based on chronological and bio-bibliographical arrangement. This was the same system that had been employed in the previous century by John Freind (1725-1726). Littré's work was considered valid and, with no critical attitude whatsoever, Tomás Santero and Ramón Esteban-Ferrando translated from the French (1842-1844) a large part of the enormous introduction to Littré's work, plus eleven of the writings of Hippocrates. Their intention was to contribute the fundamentals of "exact, rational observation, since the books of Hippocrates... formed the basis of all medical teaching." Later, the *Aphorisms* (1844) and *Prognostics* (1848) were published separately. The translations of the same pattern of books, from Latin or French, followed the same pattern of zero critique. Examples are the translations by J. Rivier and J. Montilla (1841), López-Arcilla (1843), Bosch y Canals (1843), Arce y Luque (1847), Gutiérrez de la Vega (1851), González de Sámano (1852) and the republished versions of the translations by Manuel Casal (1843) and Tomás García-Suelto (1845, 48 p.s.s.). During this period no work of Galen was published or translated in Spain.

However, at the end of the first third of the nineteenth century in the whole of Europe, "the complete break of the physician with all that had gone before and the changeover to the 'positive period' of his discipline seemed to be an irreversible and redeeming fact... The *Ignorantia temporis acti* was converted into a little less than praiseworthy rule" (Laín, 1950).[5] This was the attitude adopted of Pedro Mata and all the defenders of naturalist positivism. In the course of time it prevailed, being confirmed officially in the new plan of studies (1841), by which the texts of Hippocrates were removed definitely from the medical curriculum.

It now became necessary to find a new approach to ancient medical authors. This could only be achieved by means of a work which had been fashioned in accordance with the new history and philology and which at the same time incorporated scientific methods and accuracy. Here began what Temkin[6] has called the "historical phase" of Galenism and Hippocratism. In order to understand the complete lack of studies or translations of the *Corpus Hippocraticum* in Spain in the second half of the nineteenth century, as well as the presence, in the final years of the same century, of the exceptional figure of Donaciano Martínez-Vélez and his foil, José de Letamendi (1828-1897), it is

5. Cf. n. 28 infra.

6. O. Temkin, *Galenism. Rise and Decline of a Medical Philosophy* (Ithaca and London: Cornell University Press, 1973).

necessary to bear in mind that Spain was completely ignorant of European studies of ancient medicine. These European researchers centered on a rigorous, accurate approach to the sources, as much from the viewpoint of medical history (the work of Daremberg, Greenhill[7] and Puschmann) as from the philological viewpoint (the plan of *Corpus Medicorum Graecorum,* 1901-1908, by H. Diels). These movements scarcely produced a reverberation in Spain. The deficiency in reaction resulted from the weak institutionalized character of Spanish science in the second half of the nineteenth century and the first decades of the twentieth, both in classical philology and in the history of medicine.

Despite the unsatisfactory condition of Spanish medicine in the second half of the nineteenth century, the combined efforts of a very small number of men, whose economic, social, and political situation was relatively favorable, succeeded in giving form to the scientific currents of Europe in one or two institutions that were sensitive to external changes. One of these men was Federico Rubio y Galli (1827-1902), a typical Victorian liberal scientist, professor of surgery in Madrid, and the founder there of an institute of surgery, the home of surgical specialization in Spain. Rubio adopted the same attitude toward the medical past that was adopted by Virchow in Berlin[8] and by Hyrtl and Billroth in Vienna.[9] His interest in "precedents" led him to include in his magazine, *Revista Iberoamericana de Ciencias Médicas* (RICM), founded in 1899, studies on the history of medicine along the lines of the different tendencies existing in the German world. Unfortunately, his death in 1902 interrupted this collaboration and the magazine fell into decline. Federico Rubio looked upon the history of medicine as a medical discipline, not as a dialogue with the dead. For that reason he included it in his *Revista.*

Another contributor to the magazine was Luis Comenge. Until the Civil War (1936-1939), he was undoubtedly the greatest medical historian in Spain. The attitude and work of Comenge are a Spanish reflection of the work of Haeser, Daremberg, and especially, Puschmann.

The work of Donaciano Martínez-Vélez (d. 1899). The most important contemporary Spanish contribution toward the understanding of the texts of ancient medicine was achieved in the context of the work undertaken by Donaciano Martínez-Vélez when he translated directly from the Greek (with

7. H. S. Jones, "Preface 1925," in Liddell and Scott, *A Greek-English Lexicon,* (Oxford, 1968) v-vi; H.E. Sigerist, "Emile Littré uber Charles Daremberg," *Sudhoffs Archiv, 23* (1930):282-384, Cf. n. 11 infra; E. H. Marshall, "William Alexander Greenhill (1814-1894)," in *Dictionary of National Biography* (London, 1909) vol. 22(suppl.).

8. E. Ackernecht, *Rudolf Virchow. Artz, Politiker, Antropologe* (Stuttgart, 1957).

9. O. Temkin, "Wunderlich, Schelling and the History of Medicine," *Gesnerus, 23* (1966):188-193.

abundant critical notes, basically philological) six treatises by Hippocrates: *De capitis vulneribis, De diaeta in acutis, De aere aquis locis, De prisca medicina, Prognosticon* and *Iusiurandum.* All these appeared between 1899 and 1900, in Rubio's *Revista.* The translations were accompanied by two brief programmatic notes. The first dealt with the manuscripts of Hippocrates in Spain (1899), and the second with what Martínez-Vélez called "Materials for the History of Ancient Medicine" (1900).[10]

We know nothing about Donaciano Martínez-Vélez. We only know that he was a member of the Rubio Institute and that he possessed a good knowledge of Greek, Hebrew, and Sanskrit. The problem which he set himself was ambitious. It was none other than "to produce a new edition of Hippocrates..., and the first critical edition of Galen" (M.-Vélez, 1899e). But whether on account of his advanced age, or for other reasons of which we are ignorant, he himself said on occasion that his mission was confined to "sowing the grain" and "compiling the first material." His secondary scholarship was based on the writings of Hippocrates; he never did edit or translate Galen.

The critical work was based on the manuscripts known to Littré, Daremberg, Ilberg, Schöne, Külewein and Diels, but also on various uncollated Hippocratic manuscripts present in Spain. Some, such as Escurialense E-II-10, which contains a text of the *Aphorismi* copied in the tenth century, modify the genealogical classification of Ilberg. For this reason, at the same time Martínez-Vélez denounced the terrible state of philological studies in Spain, he issued a summons to Spanish society and government calling upon them to support the basic work of classification and study of the existing manuscripts in Spain, and to publish the works of the two greatest Greek medical authors in critical editions.

> As soon as we neglected to do so, foreigners came to do this study. Littré did it, not because it was his intention to compare the Parisian manuscripts with one another; probably he was unaware of those in the Escorial. Ilberg and Kuhlewein do not mention them in their Prolegomena. But while we delay, they make speed and are punctual, as they always are in these matters. Miller, Graux and Daremberg had to come here to put together an extensive index, a kind of inventory of our Greek and Arabic manuscripts. The people who have derived some benefit from our manuscripts are almost all of them foreigners. This is a great cause for shame for us Spaniards who, in these matters, resemble uncivilized countries, in that we do not appreciate what

10. D. Martínez-Vélez, "Hipócrates. De las heridas en la cabeza," *RICM,* 1(1899) [a] 224-234; "Hipócrates. Aguas, aires y lugares," *RICM, 1*(1899) [b] 465-480; "Hipócrates. Acerca de la antigua medicina," *RICM, 2*(1899) [c] 213-240; "Hipócrates. Acerca de la dieta en las enfermedades agudas," *RICM, 2*(1899) [d] 519-537; "Códices de Hipócrates en España," *RICM, 2*(1899) [e] 538-540; "Hipócrates. Acerca de la dieta en las enfermadades agudas: parte espuria," *RICM, 3*(1900) [a] 479-485; "Hipócrates. Del pronóstico," *RICM, 4*(1900) [b] 261-269; "Hipócrates. El juramento," *RICM, 4*(1900) [c] 528.

we possess and allow others to exploit our resources. It is indeed true that these works of research are usually financed by their respective governments, even if it is a question of coming here to do us a charity. Meanwhile those who govern us do not concern themselves with these matters, as if such a work could be left to private initiative, as if these studies were not productive in as far as the esteem of civilized nations and the harmony with them is concerned (1899e).

This denunciation of the bad situation of classical studies continued, and it was on this note that Martínez-Vélez began his collaboration in Federico Rubio's *Revista:*

> ...on the continent, the versions [of Hippocrates' writings] have doubled in number because foreigners place great importance on the various classic studies. (M.-Vélez, 1899b)

Martínez-Vélez did not, however, bask in self-complacency. He criticized the earlier Castilian versions of the writings of Hippocrates (as much Santero's as the others already mentioned), saying that they were "not at all critical and only slightly accurate." He identified with the translations of Andrés Piquer (1st edition, 1757).

> ...a unique and magnificent attempt to translate the Greek text into the Castilian language..., he published three volumes, which included the book of the *Prognosticon* and the first and second *Epidemics*. Nobody has continued the work which he initiated so brilliantly (M.-Vélez, 1899b)

At the same time as he carefully sought a text which would serve as a satisfactory point of departure for his work, Martínez-Vélez was also occupied with adequate translation of Greek terms into Spanish and with the degree of attention that must be given to the translation of Greek terms into Spanish and with the degree of attention that must be given to the translation. His interest in communicating the Hippocratic text to Spanish physicians of his time moved him not only to translate the text, but also to adopt the historiographical approach of Daremberg.[11] For Daremberg the history of medicine was justified because it showed clearly the only possible path towards scientific progress, i.e., the experimental method. Indeed, history proved the importance of theories and the power of facts, the unanimity of *a priori* systems, and the slow but beneficial and irresistable action of the observational method and the experimental methods on the establishment of general laws of pathology and therapy.[12] Following this plan, Donaciano Martínez-Vélez did not hesitate to see precedents of the Darwinist theory of evolution in certain texts of Hippocrates. The last

11. Ch. Daremberg, *Hippocrate traduit du grec sur les textes manuscrits...* (Paris, 1845); A. Chereau, "Charles-Victor Daremberg," in *Dictionnaire Encyclopédique des Sciences Médicales,* (Paris, 1864-1889) vol. 25, 643-645.

12. Cf. n. 7 *supra.*

known works of Martínez-Vélez were published in 1900 in Federico Rubio's *Revista.* In one of them — his translation of the *Prognosticon* — he pointed out that he had confined himself to translating the text of Hippocrates, without adding any kind of critical apparatus whatsoever,

> ...because I plan to produce a closer study of the present book, as soon as I can collate the manuscripts of Hippocrates which we possess, here, in Spain (1900b).[13]

The achievements of Federico Rubio and Martínez-Vélez disappeared with them, for they lived in a society insensitive alike to the denunciations and to the research program formulated by Comenge in Barcelona and Martínez-Vélez in Madrid. Their work was discontinued because their efforts did not achieve even the bare minimum of an institutional framework in Spain. From the point of view of the history of medicine, studies on the *Corpus Hippocraticum* attained the desired level with the work of Pedro Laín (1941). This eminent scholar produced the first exact approaches to Galen in his book *Disease and Sin* (1950, 1961) and in his lectures on the history of medicine, presented in the faculty of medicine in Madrid (1961-1962). An indirect result of Laín's influence was the translation in Argentina of works of Galen (discussed below).

The method of José de Letamendi (1828-1897). Almost at the same time as Martínez-Vélez was working on his versions of the Hippocratic works, the Catalan, José de Letamendi, Professor in Pathology in the Faculty of Medicine in Madrid, and a member of the same generation as Federico Rubio, published *Elements of Greek Lexicology as Applied to Medical Technical Terminology* (1881) and a translation, with commentaries, of what he called *The Hippocratic Text on Medical Decorum* (1894),[14] in other words, the *Insiurandum, Lex* and the first book of the *Aphorisms.*

The *Elements* is the first attempt in Spain of which I am aware to introduce the teaching of medical terminology into the Faculties of Medicine so that the students might: 1) understand technical words; 2) submit them to critical analysis, and 3) know how to put them together. Apart from this innovation, it can be said that in his approach to the writings of Hippocrates, José de Letamendi presented the antithesis of all that Martínez-Vélez attempted and achieved. His approach to ancient medicine must be viewed in a double context: on the one hand, of his general concept of the history of medicine and on the other of his attempt to base the guidelines of medical practice in Spain on concrete Hippocratic texts.

---

13. Cf. n. 10 *supra.*

14. J. Letamendi, *Elementos de lexicología griega con aplicación al tecnicismo médico* (Madrid, 1881); J. Letamendi, "Canon fundamental del arte médica [y] Codex Hipócratico de la decencia médica...," in *Curso de clínica general*„ (Madrid, 1894) 33-81.

Letamendi's medical line of thought is that of the superannuated German "Naturphilosophie."[15] Likewise, his concept of the history of medicine corresponds, in certain ways, to that of Damerow, so harshly and ironically criticized by Haeser and Heusinger.[16,17]

Letamendi "attempted to elaborate an individualist, Hippocratic conception which would offer a new, and in his opinion, solid base for medical knowledge."[18] The concept was to serve also for medical practice, which would fit into the guidelines of conduct that defined the bourgeois morality of Spanish cities at the end of the nineteenth century. The Hippocratic texts, accompanied by a very deliberate translation, unaccompanied by critical apparatus and followed by speculative, ahistorical, and personal commentaries, were employed to provide norms of behavior suitable to the bourgeois physician, who would pretend, thereby, to make sacred the liberal practice of medicine. These norms of conduct were made public from the time of the Concordat of 1851, promulgated by a Church which identified itself completely with bourgeois ideology and which practically monopolized primary and secondary teaching in Spain, and hence exerted strong influence and control over university teaching.[19] The moral texts of the so-called divine Hippocrates were aimed at defining the role of the doctor as similar to that of a priest and thereby justified a system of medical practice based on a most unjust system of class distinction — one medicine for the rich and another for the poor (Letamendi, 1894).[20]

Letamendi declared the Hippocratic writings *(Iusiurandum, Lex, Aphorismi)* as legitimate for their "evident anticipation of the gospel" and he converted them into a perpetual set of rules for medical respectability. He even declared at the beginning of his commentary on the Hippocratic oath that it was perfectly similar in form to the Christian oath [!] (Letamendi, 1894).[21] As the basis for his version he used the text adopted by Sans y Castelin, Professor of Greek in Salamanca, a text which coincided completely with one determined by Littré.

In their methods for the approach to classical Greek medicine, Martínez-Vélez

---

15. J. Riera, *Idealisme i positivisme en la medicina catalana del segle XIX* (Barcelona: Institut d'Estudis Catalans, 1973).

16. E. Heischkel, "Die Geschichte der Medizingeschichtsschreibung," in W. Artelt, *Einfuhrung in die Medizinhistorik* (Stuttgart, 1925) 202-237.

17. Cf. n. 9 *supra.*

18. L. S. Granjel, "Traducciones castellanas de Hipócrates," in *Homenaje a Antonio Tovar* (Madrid, 1972) 169-176.

19. V. Carcel, "El nuncio Brunelli y el Concordato de 1851," in *Anales Valentinos,* 1(1975):79-198.

20. Cf. n. 14 *supra.*

21. *Ibid.*

and Letamendi were diametrically opposed. The former was meticulous and scientific, the latter was prone to fantasy and speculation. For example, in contrast to the picturesque ahistorical version which Letamendi employs in his attempt to determine the paternity of the *Oath* of Hippocrates, Martínez-Vélez, faced with the same text and problem, gives a succinct explanation of the state of research into that subject at the time of writing (Letamendi, 1894;[22] M-Vélez, 1900c[23]).

The program and the translations of Martínez-Vélez passed rapidly into oblivion, causing a real regression to a situation comparable to the worst years of the nineteenth century. The translation of García-Suelto (first published in 1830) was reprinted three times (1906, 1921, 1923). The *Aphorismi* and *Prognosticon* were translated yet again without scholarly apparatus by A. Zozaya (1904). Another anonymous edition of the *Aphorismi* appeared (1932) along with the so-called *Gynaecology of Hippocrates* by C. Conill and Montoblio (1919). The Classics Library directed by Menéndez-Palayo included no medical treatise. If we broaden the panorama to include Greek and Latin classics of science, up until 1939 we can only mention the bilingual editions (Latin-Catalan) of Lucretius (edited by Joaquin Balcells), of Pliny (by Marçal Oliver), of Cato (by Salvador Galmés), all of which appeared in the Bernat Metge Collection, plus the only really valuable Castilian translation, that of Aristotle's writings on biology prepared by Gallach Palés (1932-1933), a lecturer on secondary school teaching. Galen remained completely sunk in oblivion.

In the first third of the twentieth century an event occurred in Germany which was to open new possibilities in the study of ancient medicine. This was the collaboration between medical historians and philologists in Berlin at the recently founded institute for the history of medicine (1929) when the young philologist Ludwig Edelstein (1902-1966) along with others came in contact with the director of the institute, Paul Diepgen. Edelstein had worked on the Hippocratic *De aere aquis locis* for his thesis. He arrived in 1930 to take up the post of assistant at the institute.[24] The national-socialist movement caused Edelstein to continue his work in the United States at the Johns Hopkins University in Baltimore, where he was named Professor Extraordinarius of the History of Medicine and served with two other professors of the history of

---

22. *Ibid.*

23. Cf. n. 10 *supra.*

24. H. Diller, "Ludwig Edelstein," *Gnomon,* 38(1966):429-432.

medicine from Leipiz, Henry Sigerist and Owsei Temkin. Later, in the 1960s, the *Corpus Medicorum Graecorum* building upon the earlier concepts outlined opened up new horizons by Deils.[25] Jutta Kollesch wrote: "Nowadays even in the case of the classical philologist it is no longer to be assumed unconditionally that he can understand an ancient medical text in all its details. How much more difficult it must be for the medical historian to read ancient writings in the original. However, the growing interest within the history of medicine in ancient history, has induced the directors of the *Corpus Medicorum Graecorum,* contrary to the original idea, to offer the texts accompanied by translations into a modern language. As such, the field of interest covered by the texts is widened so that they may be used not only in philological research but also in historico-medical research."[26]

This pattern was to be repeated in Spain years later owing to the interest aroused among Spanish philologists by the work of Laín on ancient medicine. Of these scholars Laín in 1970 declared that "they constitute one of the most solid new realities of our uneven scientific life." Philology, as it is understood in the cultured Europe of the 1930s, was introduced into Madrid through the initiative of Menéndez-Pidal, who incorporated it in his Centre of Historical Studies in 1933, at the same time as he founded the magazine *Emerita.* The Center made possible the meeting and formation of a group of philologists among whom were Bonfante, Pavón, and Tovar.[27]

During the disaster which the Spanish Civil War (1936-1939) brought about for Spanish science, some disciplines managed to subsist and even develop through a mixture of official support and personal effort, as is attested by the work in philology of Antonio Tovar, Professor at Salamanca, and in the history of medicine by Pedro Laín, Professor at Madrid.

Pedro Laín's studies of ancient medicine began sporadically in 1941. They resulted from his recent acquisition of the Greek language and his intellectual habit of wondering about bases — in this case, bases of western medicine. The studies reached fruition in 1944 with his essay "The text of *Prisca Medicina* and its historiographical importance," which he published in the philological journal *Emerita.* Later, his books *Clinical History* (1950), *Disease and Sin* (1950, 1961), *Healing by word in Classic Antiquity* (1958), *The patient-doctor relationship* (1964), and *Hippocratic Medicine* (1970), his major contribution to the subject,

---

25. H. Diels, "Bericht über den Stand des interakademischen Corpus Medicorum Antiquorum...," *Abh. d. Königl. Preuss. Akademie c. Wiss.* (Berlin, 1908) 3-22.

26. J. Kollesch, "Das Corpus Medicorum Graecorum, Konception und Durchfuhrung," *Medizinhistorisches Journal,* 3(1968):68-73.

27. F. Rodríguez-Adrados, "Lenguas clásicas y educación en la España contemporánea," *Revista de Occidente,* 148(1975):78-98.

were to produce the "Edelstein phenomenon" in Spanish philology.[28] The effects can be seen in the work of Luis Gil, *Therapeia; Popular Medicine in the Classic World,*[29] continued by N. Fernandez in his treatise *The 'Thaumata' of Sophronius, A Contribution to the study of Christian 'Incubatio'.*[30] At the beginning of his book Gil declares: "it is absolutely imperative that we should know the methods used by medical historians who have done research in fields of study related to ours." Gil here referred not only to the work of Laín but also to studies made by Erwin Ackerknecht in cultural anthropology as applied to medicine. Likewise worthy of note in this connection are the contributions made to the history of medicine by the philologist, Lasso de la Vega and more recent doctoral theses and studies.[31]

In 1947, Anibal Ruiz Moreno, Professor in the Department of History of Medicine in Buenos Aires, founded a collection of the classics of medicine in order to bring the translations of the great physicians, amongst them Galen, to the Spanish-speaking doctor. In that same year, in Buenos Aires, two volumes of total and partial translations of eight Galenic or pseudo-Galenic works were published. The accuracy of these translations can be judged by the fact that they were taken from the Latin text of the Venice edition of 1586; it was impossible to obtain a Greek text at that time in Argentina. We must not forget that Anibal Ruiz was a friend of Pedro Laín and that he was co-editor of the first periodical on the history of medicine to appear in Spain, founded by Laín (1949). During his sojourn in Buenos Aires in 1948, Tovar — also a friend of Laín — collaborated with Ruiz in the translation of Galen's *De differentia pulsuum* and *De pulsibus ad tirones* from the Greek text of the Kühn edition.

It cannot truly be said that these events mark the beginning of an interest in Galen among Spanish physicians. Until the 1960s there was in Spain no systematic development of Laín's program in ancient medicine. Only two of his pupils followed this aspect of his work: Agustín Alberracín, with his studies on medicine in the Homeric epos and I with my research on Galen.[32] Although at the present moment a growing interest in the Galenic documents can be detected, it is

28. P. Laín, *La historia clínica,* (Barcelona, 1950); *La curación por la palabra en la Antigüedad clásica* (Madrid, 1958); *Enfermedad y pecado* (Barcelona ([1950] 1961); *La relación médico-enfermo* (Madrid, 1964); *La medicina hipocrática* (Madrid, 1970).

29. L. Gil, *Therapeia. La medicina popular en el mundo clásico* (Madrid 1969).

30. N. Fernández, *Los 'Thaumata' de Sofronio. Contribución al estudio de la Incubatio cristiana* (Madrid: CSIC, 1975).

31. J. Muñoz, *Pseudo-Hipócrates. Sobre el feto de siete meses* (Madrid: CSIC, 1973).

32. L. García-Ballester, "La contribución española a la historia de la medicina antigua. Siglos XIX y XX," *Cuadernos de Historia de la medicina Española,* 14(1975):55-86.

certain that in Spain this interest never materializes in the form of concrete research or translation of Galenic texts. Internationally however, such materialization of interest is easily perceived: among the most important proofs are the upsurge in the publication of Galenic texts in the *Corpus Medicorum Graecorum* and the beginning of the *Galenus Latinus* series under the direction of Richard J. Durling and Fridolf Kudlien of Kiel.

Besides the group of Castilian philologists whose initial efforts centered around the work of Menéndez-Pidal in Madrid, we must not overlook the important Catalan tradition of philological study, born out of the desire to endow Catalan culture with a philological basis and to incorporate in it the great Greek and Latin classics. This movement is exemplified by an enterprise unparalleled in the Iberian peninsula — the publication, under the patronage of the Bernat Metge Foundation of bilingual (Greek-Catalan and Latin-Catalan) editions of the classics, after the model of the Budé series. The undertaking was directed by Joan Estelrich, Carles Riba, and Joaquín Balcells. No medical text, either in Greek or Latin, was included. The years immediately following the Civil War in Catalonia broke the continuity. This factor added to the lack of medical historians in Barcelona who were capable of arousing interest in the subject, and meant that in the area of Catalan philology no work on ancient medicine was produced until 1968 when, under the direction of Josep Alsina,[33] Professor of Greek Philology at Barcelona, Eulalia Vintró wrote a baccalaureate thesis on the *De morbo sacro* and later continued her studies in her doctoral thesis, *Hippocrates and Hippocratic nosology.*[34] In that year Josep Alsina and Eulalia Vintró published in the Bernat Metge Collection a bilingual Greek-Catalan edition of the Hippocratic *De Morbo Sacro;* this work formed Volume I of *The Medical Treatises of Hippocrates.* Significantly, the book is dedicated to Laín. In 1976, the second volume, containing *De aere aquis locis, Prognosticon* and *De prisca medicina,* was published.[35]

---

33. J. Alsina, "Hipócrates. Sobre la medicina antigua," *Convivium,* 28(1968):105-124; "Sobre la medicina hipocrática," *Estudios Clásicos,* 13(1968):13-14; "Hipócrates. Sobre el medio ambiente," *Estudios Clásicos,* 13(1969):325-353; "Hipócrates. La enfermedad sagrada," *Boletín del Instituto de Estudios Helenicos,* 4(1970):87-96.

34. E. Vintró, *Hipócrates y la nosología hipocrática* (Barcelona, 1972).

35. J. Alsina: E. Vintró, *Hipócrates. Tractats mèdics.* I: *El Mal Sagrat* (Barcelona, 1972); II *Sobre el aires, aigües i llocs. Prognòstic. Sobre la medicina antiga* (Barcelona, 1976).

Recently, Francisco Vera, to whom we owe important works of research on the history of science, has prepared an extensive anthology of Greek science,[36] commissioned by the "Editorial Aguilar." Included in this work are texts of Hippocrates and four Galenic writings, translated from the Latin by Anibal Ruiz Moreno. The translations lack accuracy and are of the same commercial nature as most books in the Classics of Science series issued by the "Editorial Aguilar." These products merit the same criticism that Daremberg made in 1845 and 1851 in relation to Kühn's editions of Hippocrates and Galen.

Faculty of Medicine
University of Granada
Granada, Spain

36. F. Vera, *Científicos griegos*, 2 vols. (Madrid, 1970).

Memoir of Gonzalo Enrique Aponte
1929-1979

WILLIAM F. KELLOW, M.D.

GONZALO Enrique Aponte was born in Santurce, Puerto Rico, in 1929, and he was an academic scholar from his earliest years. A graduate of Georgetown University, he had a remarkable career as a medical student at Jefferson, and upon his graduation in 1952, he received eight prizes for academic achievement.

He was trained as a pathologist at Jefferson under the direction of Dr. Peter A. Herbut whom he eventually succeeded as Chairman of the Department of Pathology in 1966.

Dr. Aponte was a distinguished medical teacher, and the students at Jefferson presented him with every possible award. In 1962 upon election by the students, he was designated the Lindback Awardee for Distinguished Teaching. The Phi Chi Fraternity and the Phi Alpha Sigma Fraternity presented him with awards for distinguished teaching. The Class of 1971 presented his portrait to Jefferson Medical College, the highest honor that students can bestow upon a faculty member. Repeatedly, he was elected by graduating classes to address them on Class Day and to administer the Hippocratic Oath at graduation.

Gonzalo Aponte also was a medical scientist. In 1960 he was made a Markle Scholar. He served on the editorial board of the *Annals of Clinical and Laboratory Science* and as President of the Pathology Society of Philadelphia. Author or co-

author of more than fifty articles, he was selected to be Clinical Scientist of the Year by the Association of Clinical Scientists in 1967.

In addition to all of his academic duties and accomplishments, Gonzalo Aponte had other interests including medical art and medical history. He was a member of the American Association for the History of Medicine and he served as Chairman of the Mütter Museum Committee at the College of Physicians of Philadelphia.

A devoted and respected member of the Jefferson alumni, he was elected President of the Jefferson Alumni Association in 1977 and for a number of years served as Chairman of the Alumni Committee on Publications.

Gonzalo Enrique Aponte died on June 15, 1979 when he appeared to be at the zenith of his remarkable career as a scientist, educator and leader of medicine. The sympathy and sorrow of his host of friends and former students is extended to his mother, Lalita Socorro, his sisters, Mary Martha and Rose Marie, and his brothers, Mario, Andres and Alfredo.

Memoir of Charles C. Chapple
1903-1979

JEAN A. CORTNER, M.D.

CHARLES C. Chapple, M.D., a former member of the staff at the Children's Hospital of Philadelphia, died March 23, 1979, at the age of 75. At the time of his death from cancer, Dr. Chapple was living in Omaha, Nebraska, where he had resided since retiring as professor of pediatrics at the University of Nebraska Medical Center in 1974.

Dr. Chapple came to Children's Hospital in 1928 as a pediatric resident, after serving an internship at the University of Michigan Hospital and graduating from that university's medical school. Dr. Chapple served on the staff of Children's Hospital as a senior physician and a member of the research staff, and as professor of pediatrics at the University of Pennsylvania School of Medicine until 1953.

During his tenure in Philadelphia, Dr. Chapple served also as consultant to the Shriners Hospital and the U.S. Naval Hospital, where he established a residency program in pediatrics. During World War II he was a special consultant to the U.S. Army's chemical warfare service. Later he was consultant to the advisory board of the National Aeronautics and Space Administration.

Upon his leaving Children's Hospital, Dr. Chapple became chief of clinical studies for the Veterans Administration. In 1966, he joined the staff of the University of Nebraska Medical Center. He held membership in the Pediatric Research Society and the American Pediatric Society.

Although I did not have the privilege of knowing Dr. Chapple, I am reminded of him when I pass the Infant Intensive Care Unit at Children's Hospital. While on staff there, Dr. Chapple was responsible for developing the Isolette-incubator, modifications of which are now used worldwide to aid premature and critically ill infants.

Dr. Chapple's accomplishments touch other areas as well. He developed a cool-water maxi-mist spray for croup tents, used in the treatment of respiratory ailments. He designed the glycol evaporators used for air disinfection, as well as a number of orthopedic devices used by schools in their health programs. He was among the first to diagnose congenital hip dislocation in infancy and was an early proponent of the administration of medication by inhalation.

My colleague, C. Everett Koop, M.D., surgeon-in-chief at Children's Hospital, remembers Dr. Chapple as "a very creative, imaginative guy. He was an important asset to a hospital like Children's, where young, enthusiastic researchers could bounce ideas off each other and get encouragement, not ridicule."

I would like to think that those who worked with and learned from Dr. Chapple throughout the years inherited the same spirit of determined inventiveness that marked the noteworthy career of this fine pediatrician.

Memoir of John Vernon Ellson
1898-1979

LAWRENCE S. CAREY, M.D.

ON May 14, 1979, the Philadelphia and Delaware County areas lost one of its most endeared medical practitioners in the death of Dr. J. Vernon Ellson. Over a period of more than fifty years, Dr. Ellson served his community as a most competent figure in the practice of obstetrics and gynecology. He was Director of the Obstetric and Gynecologic Service at the Delaware County Memorial Hospital for twenty-three years, and during that time had the still somewhat unusual distinction of delivering one set of quadruplets.

Dr. Ellson was born in Mattawan, New York on July 14, 1898. His parents moved to Philadelphia and Dr. Ellson attended grade schools in the city. In 1915 Dr. Ellson entered the undergraduate College of the University of Pennsylvania and was graduated with the degree of Bachelor of Arts in 1919. This period was interrupted for a short time by enlistment in the U.S. Army in World War I. In his undergraduate years, his athletic prowess was demonstrated as stroke oarsman on the University of Pennsylvania sculls crew.

Dr. Ellson entered the Medical School of the University of Pennsylvania and was graduated with honors in 1923. He then became a resident physician at the Pennsylvania Hospital, 8th and Spruce Streets, from 1923 to 1925. Upon completion of his residency he became associated with Dr. Norris W. Vaux in obstetrics and gynecology at the Pennsylvania Hospital and continued his work there until his health forced his retirement in 1972.

In 1925 Dr. Ellson married his childhood sweetheart, Evelyn Sloat Ellson, and soon after, they moved to Upper Darby where he took up the private practice of obstetrics and gynecology. When the Delaware County Memorial Hospital opened its doors in Drexel Hill, Dr. Ellson was a charter member of its staff. In 1941 he was appointed Director of the Obstetric and Gynecologic Service and held that position from 1941 to 1963, then continuing private practice until 1972.

Dr. and Mrs. Ellson had three children: the oldest son, John Vernon Ellson, Jr., died in a railroad accident; a daughter, Marjorie, died the following year of a prolonged attack of typhoid fever; and another son, Stanley Ellson, lives with his wife near Buffalo and has two sons, both now in college.

Dr. Ellson's professional career was again interrupted by his enlistment in the U.S. Army for service in the Second World War. He served with the Pennsylvania Hospital unit in the South Pacific for two years. He was transferred to the European theatre in charge of a Medical Unit for a year, and, at the end of the war, was discharged with the rank of a full Colonel. He then returned to private practice in the Philadelphia and Delaware County areas and continued until 1972

when disability from multiple "strokes" forced his retirement.

Dr. Ellson's medical accomplishments were many as shown by his wide associations, teaching appointments, and memberships in medical organizations:

1. Board certified in obstetrics and gynecology in 1938.
2. Member of the American Medical Association.
3. Member of the Delaware County Medical Society and served as its President for one term.
4. Consultant in obstetrics and gynecology at Woman's Hospital.
5. Founding Member of the American College of Obstetrics and Gynecology.
6. Member of The College of Physicians of Philadelphia.
7. Member of the American College of Surgeons.
8. Associate Professor of Obstetrics and Gynecology at Jefferson Medical College.
9. Associate Professor of Obstetrics and Gynecology at the University of Pennsylvania Medical School.
10. Member of the Philadelphia Obstetric Society.
11. Member of the American Society of Clinical Hypnosis.
12. Member of a Local Medical Club known as the "Polyologists."
13. Member of the Upper Darby Rotary Club.
14. Contributor of obstetric and gynecology articles to various medical journals.

Dr. Ellson's warm personality and inspirational enthusiasm showed itself in the conduct of his many appointments. His ability in the discerning of the decisive point in discussion made him a most desirable member of any committee. His keen sense of humor was a striking element in his warm associations with those with whom he worked.

It is a reflexion of his great interest in community affairs that both he and Mrs. Ellson took a considerable part in the establishment of a playground for children and youths of Springfield, near their home.

A great boon in his long and trying illness was the tender and devoted care of his loving wife. All who knew Dr. Ellson will miss him always.

Memoir of Robert Henry Ivy
1881-1974

HENRY P. ROYSTER, M.D.

DR. Robert Henry Ivy, a Fellow of the College of Physicians of Philadelphia since 1921, died peacefully in his sleep 21 days after his 93rd birthday. He enjoyed, and the word is used advisedly, every day of his life, and his last meal consisted of a fresh trout he had caught near his summer cottage at Skytop, Pennsylvania, the previous day. How we all wish God would be so good to us! Though born in Southport, England, Bob transferred his total allegiance to Philadelphia and to his chosen field of plastic surgery. He was unique in many ways, and one of his accomplishments, and a kindness to the writers of his memoir, was his autobiographical volume, "A Link with the Past" (The Williams & Wilkins Co. 1962). It is well worth one's while to read it, and Philadelphians will hardly wish to put it down until the end.

He was a graduate of the University of Pennsylvania, first in Dentistry in 1902, and then in Medicine in 1907. Actually, he completed his dental studies in 1901, but his diploma was withheld until 1902 when he reached the age of 21. In 1901 he became the second dental intern at the Philadelphia (General) Hospital, serving until 1903. This remarkable man matriculated in the medical school and completed his first two years while still serving his dental internship. His study was interrupted for a period of two years, in the spring of 1904 at the direction of his Father who wished him to travel to China and be a part of his own work as a dentist. Upon return to Philadelphia he completed his final year of medicine and received his degree in 1907.

Dr. Ivy devoted his time to various fields of medicine and dentistry thereafter, first accepting an internship at the Episcopal Hospital where he became acquainted with and later married Norma Crossland, who was a student nurse at the same institution. His first years in practice were in association with his uncle, Dr. Matthew Cryer, an oral surgeon. His additional activities involved clinical pathology, immunology and moonlighting in his own laboratory in his home. In 1915 he moved to Milwaukee, Wisconsin, because of the slow pace of his practice in Philadelphia. There he was engaged in the practice of oral surgery, but had the opportunity to meet and know well a number of men in various fields.

In 1917 he joined the U.S. Army Reserve and later received orders posting him to Walter Reed Hospital where he became assistant to Dr. Vilray P. Blair. Bob regarded this assignment as the critical point in his professional career, for the benefits from this association were lifelong. Bob remained active in the Army Reserve until late in life. Following World War I, Bob maintained an active practice in general plastic surgery at several hospitals in the Philadelphia area

until his retirement from teaching duties in 1951, and from practice in 1955. A new career, begun in 1949 when he assumed part time work as director of the Cleft Palate Division, in the Pennsylvania Department of Health, continued after retirement in 1955. Another duty, editorship of the *Journal of Plastic and Reconstructive Surgery,* assumed in 1946, occupied him until 1974. A monumental task alone, but back breaking on top of his other responsibilities, this seemed to stimulate him to increased activity. In essence, he put the journal 'on the map'.

Bob received many awards and honors, too numerous to mention in entirety. The University of Pennsylvania gave him the Alumni Award of Merit, Hon. Sc.D., membership on the Board of Trustees, and the painting of his portrait, through the Robert H. Ivy Society. Others were awards from the two major national plastic surgery societies, the Strittmatter Award of the Philadelphia County Medical Society and, by his own pupils and colleagues in Philadelphia, his name as patron of the local regional plastic surgery community. His bibliography totalled over 150 articles on medical topics and he authored or coauthored six books.

Bob never relaxed and his activities and influence in plastic surgery continued until the end. His last paper, "Personal Recollections of Holders of the John Rhea Barton Professorship of Surgery at the University of Pennsylvania School of Medicine," was delivered at a meeting of the Philadelphia Academy of Surgery on February 11, 1974. He was also everybody's dean of plastic surgery.

Surviving are Mrs. Ivy, four children, fourteen grandchildren, seven great-grandchildren, and a host of friends the world over.

Memoir of Herndon Briggs Lehr
1923-1979

WILLIAM T. FITTS, M.D.

HERNDON Briggs Lehr died on June 3, 1979, at the young age of 56, of a fulminating hepatitis, in New Orleans. He was attending a meeting of the American Association of Tissue Banks, of which he was a founding member.

Dr. Lehr was known to his many friends and to himself as "Bugs." At the time of his death, Bugs was Chief of the Division of Plastic Surgery of the School of Medicine of the University of Pennsylvania. Bugs remained a southerner until the end. He was born in Laurel, Mississippi and grew up in Valdosta, Georgia, and his southern accent and style of life never left him.

Bugs received a chemical engineering degree from the Georgia Institute of Technology, even though this was interrupted for approximately four years by service in the United States Army from which he was discharged as a Captain in the Army Security Agency. Following this he attended medical school at the University of Pennsylvania from 1948 to 1952, interned there for two years and held appointments as Clinical Trainee of the National Heart Institute and as a Damon Runyon Memorial Fund Cancer Research Fellow. After finishing his residency, both in General Surgery in 1957 and in Plastic Surgery in 1959, he became a Senior Clinical Fellow of the American Cancer Society for three years beginning in 1962. He ascended the academic ladder, becoming a full professor in 1969. He succeeded Dr. Henry Page Royster on Dr. Royster's retirement from his administrative duties at about the same time.

I believe the most outstanding characteristic that Bugs brought to his school was that of a "talent scout." He picked superb young men to work in his division and he had an uncanny ability to attract them to his division, in spite of excellent job offers from other surgical specialties. In this manner he built one of the strongest plastic surgical services in the country, enlarging on the service founded by Dr. Royster. His residents admired him greatly and all called him "Boss," as did many others of the staff of the Hospital of the University of Pennsylvania.

Bugs Lehr contributed significantly to research. In spite of a busy clinical practice, mostly at the Hospital of the University of Pennsylvania, but also at a number of other hospitals, he made time to initiate and participate in excellent research projects. He turned to his engineering talents to develop a special apparatus for freeze-drying vascular grafts. Having developed the apparatus, he put it to good use by harvesting approximately 200 aorta-iliac bifurcation grafts, mainly from accident victims at the Philadelphia Morgue. More than 100 of these were actually implanted and were the subject of a follow-up study several years ago, showing that many had remained successful.

In plastic surgery his great interest was in the preservation of tissue. He and his colleagues adopted the method which the veterinary profession had found feasible for the preservation of bull sperm: to glycerolize the biologic material before freezing it. The rationale was that glycerin entered the cell and prevented the formation of ice crystals with their disruptive effects. The method was effective and Bugs applied it to skin, first for autografts and then for homografts. He demonstrated that skin could be deep-frozen to the temperature of liquid nitrogen, thawed a year later, and reimplanted as an autograft with a satisfactory take. The homografts were used as other skin homografts, largely to cover granulating surfaces such as those arising from extensive burns; they served an interim rather than a permanent purpose.

The next problem to which Dr. Lehr devoted his remarkable energy was the preservation of kidneys by cryo-preservation. Although this problem has never yet been solved, Dr. Lehr and his group are in the forefront of the continuing research on this important and difficult problem. He has achieved success with a thinner organ, namely, the small intestine of the dog. He and his associates, Drs. Ralph Hamilton and Hazel Holst, have been able to deep-freeze small bowel, thaw it, and reconnect it to the circulation. After a period of rest and repair, it became functional again.

Bugs was a man of keen *intelligence.* This was manifested in a number of ways: in his scientific accomplishments that have been described, in his knowledge in fields outside of medicine — such as history — and in his uncanny ability to size up people in all walks of life. He liked to hide this intelligence behind a facade we southerners call "po'-mouthing," and Bugs tested 100% as a po'mouther — the best po'mouther I've ever known. I'd meet him early at the hospital at the beginning of a hospital day. The dialogue was always the same: "Morning. How are you, Bugs?" "I'm *terrible.*" "Why, Bugs?" "No prestige — no money — no patients." Actually, of course, he was doing very well in all three categories.

Another characteristic was that of *great loyalty.* Bugs was one of the most loyal humans I've ever known, both to men and to institutions. I'll give some examples:

When Henry Royster resigned as the administrative head of the Division of Plastic Surgery in 1969, I happended to be out of town. Bugs met me at the airport when my plane arrived, with tears in his eyes. He said, "Uncle Henry has resigned and you'll have to do something about it." I did all I knew how, but was unsuccessful. Bugs loved Henry, his mentor in plastic surgery, and was always extremely loyal to him.

As many of you know, the University of Pennsylvania is now in the midst of a drive. "Program for the Eighties," in which it hopes to raise 225 million dollars. It was my job in the Department of Surgery to solicit funds for this drive. When I solicited Bugs he said, "I've got no money at all. You know that. Why come to me?" Yet later he showed me his pledge care (the amount of donation being kept confidential) and his pledge was the second highest made by any of our surgical

staff up to that time.

Bugs was very proud of having been the head of the Nu Sigma Nu Fraternity during his student days, was extremely loyal to it and would always claim that his fraternity was better than my own, namely Phi Chi. It gave him great pleasure to point out that Nu Sigma Nu was the only medical fraternity to survive in recent years, and he seemed especially glad to see the Phi Chi Fraternity dissolve on campus.

Bugs was a man of great generosity. He had many friends and he gave them many things, some of them spiritual, in that he had a way about him that would cheer up a depressed person, as well as many material gifts. I cannot recall a Christmas in which Bugs did not bring me gifts out of all proportion to what I deserved. If I did a procedure for him, such as a special surgical examination, Bugs would invariably send me a present worth much more than even a large fee would be.

Bugs was not all sweetness and light. He had a competitive side that was hard to equal. I can attest to this in his and my many weight-losing contests. Bugs and I shared a weight problem and would make large bets, the winner being the one who could lose the most weight. We made each pound worth a sizable sum of money; otherwise we'd lose no weight. In one of these contests I was doing exceptionally well until the last day, when Bugs lost 12 pounds in only one day. I was astounded until his internist told me he had taken sub-lethal doses of diuretics and cathartics the night before weighing-in time, and had donated one unit of blood.

Bugs was really a giant of a man — both spiritually and physically. He will be missed by a host of friends and by his wife, Margaret and his children, Margaret, William, Henry and Lydia.

Memoir of Francis D. W. Lukens
1899-1978

ALBERT I. WINEGRAD, M.D.

FRANCIS Dring Wetherill Lukens, M.D., former professor of medicine and Director of the George S. Cox Medical Research Institute at the University of Pennsylvania, died in Pittsburgh on December 4, 1978; he had been a Fellow of the College of Physicians of Philadelphia for forty-seven years.

Francis Lukens was an internationally recognized authoritiy on diabetes mellitus, an esteemed physician, educator, and medical statesman. He was born in Philadelphia on October 5, 1899, into a family long prominent in the affairs of this city; his father was an Episcopal clergyman. He graduated from Yale University and then attended the School of Medicine of the University of Pennsylvania, from which he received his M.D. in 1925. He served as an intern and medical resident at the Pennsylvania Hospital from 1925 to 1928 and then went to study nephritis under Warfield T. Longcope at the Johns Hopkins School of Medicine. Dr. Lukens was the Jacque Loeb Fellow in Medicine at Hopkins from 1928 to 1930.

He returned to Philadelphia in 1930 and initially joined the Gastroenterology Division at the Hospital of the University of Pennsylvania, headed by T. Grier Miller. Shortly thereafter the University entered into an agreement with the trustees of the estate of George S. Cox to establish a laboratory for the study of diabetes mellitus, and Cyril N. H. Long was recruited to be its first Director. In 1932 Lukens joined the staff of the Cox Institute, and began an association that was to last for 34 years. From 1932 to 1936 Long and Lukens collaborated in a series of classic experiments that profoundly affected the direction of research in diabetes and endocrine physiology for many years and brought these investigators international attention.

Lukens was an exceptionally skilled experimental surgeon in addition to his other talents, and he was successful in preparing and maintaining cats with experimental diabetes resulting from total pancreatectomy who were also subjected o hypophysectomy, adrenalectomy, or adrenal demedullation. Lukens in collaboration with Long first reproduced the Houssay phenomenon in cats (and dogs) and then proceeded to demonstrate that adrenalectomy, but not adrenal demedullation, decreased the degree of hyperglycemia and hyperketonemia in depancreatized cats and prolonged their survival. They also demonstrated that hypophysectomy or adrenalectomy decreased the dose of insulin required to control glucosuria in depancreatized cats. These observations established the concept that insulin regulation of glucose and lipid metabolism and the effect of insulin deficiency on these processes are subject to modulation by pituitary and adrenal cortical secretions.

In 1936 C.N.H. Long accepted the chairmanship of the Department of Physiological Chemistry at Yale, and Francis Lukens was appointed Director of the Cox Institute. His faculty appointment was in the department of medicine and in time he was promoted to Professor of Medicine. Luken's laboratory in the period prior to our entry into World War II atracted many investigators who made significant contributions to the interaction of the beta-cell, pituitary, and adrenal cortex in the regulation of intermediary metabolism, including the distinguished physiologist Dwight Ingle. Lukens collaborated over a period of many years with William C. Stadie, Professor and Chairman of the Department of Research Medicine. Their efforts included classic studies that established a relationship between the rates of ketone body production and ketone body utilization and helped to establish the view that increased ketone body production is the predominant factor in the pathogenesis of the hyperketonemia of diabetic ketoacidosis.

Lukens had a life-long interest in experimental models for diabetes mellitus. He played a significant role in the development of standardized methods for the use of alloxan diabetic animals for metabolic studies and provided an invaluable review of this subject for *Physiological Reviews* in 1948. He also had a special interest in the possibility that persistent hyperglycemia that was not a primary consequence of beta-cell disease could induce persistent alterations in beta-cell structure and function and contribute to the derangements in insulin secretion presumed to occur in various human and experimental disease states. With F. C. Dohan he demonstrated that persistant experimental diabetes could be induced in the cat by repeated injections of glucose over a prolonged period. Lukens also was the first to establish a role for insulin in modulating the effects of growth hormone on nitrogen balance.

In addition to being one of the foremost endocrine physiologists of his time, Francis Lukens was a dedicated physician and clinical teacher. Throughout his career at Pennsylvania he was actively involved in patient care and medical student teaching in the Diabetic Clinic at the Hospital of the University of Pennsylvania. He was associated in these activities over his long career with Russel Richardson, W. Wallace Dyer, Ernest M. Brown, Jr., G. Clayton Kyle, Stanley Spoont, and Sidney Franklin, among others. His research fellows included many who are now or were professors of medicine or physiology in institutions throughout the United States and in Japan and Turkey.

Lukens was an astute commentator on the clinical problems associated with diabetes mellitus, and his last publications prior to his retirement from Pennsylvania in 1966 focused on questions that remain central to this field. In his Joslin Memorial Lecture delivered in Boston in 1965 he drew attention to the limitations of prolonged-acting insulin preparations in reproducing the physiological regulation subserved by normally functioning beta-cells. In the same period he and Sidney Franklin reported observations on patients with

insulin-requiring diabetes who had survived for 20 or more years without clinically significant complications and drew attention to the fact that the marked variation in the clinical course of insulin dependent diabetes mellitus probably reflects factors in addition to the quality of their hyperglycemia "control."

Lukens' interests were not restricted to diabetes mellitus and diseases of the adrenal cortex. During World War II he collaborated with John R. Neefe, Joseph Stokes, Jr., and John Reinhold in classic studies that demonstrated the transmission of hepatitis to human volunteers by the injection of human serum and pharmacological products containing serum, and helped establish the existence of transmittable agents in human serum that can cause hepatitis.

For several decades Francis Lukens played a major role in the leading professional and scientific societies concerned with diabetes and endocrinology. He was President of the American Diabetes Association in 1959, and President of the Endocrine Society in 1964. His abilities as a medical statesman were not restricted to this field and he also served as President of the American Clinical and Climatological Society in 1964 and on numerous advisory boards and commissions. He was elected to membership in the American Society for Clinical Investigation and subsequently in the American Association of Physicians. The American Association of Physicians awarded him one of their highest honors when he was selected as their Kober Lecturer in 1967. Dr. Lukens received numerous other honors including the Banting Medal of the American Diabetes Association in 1960. He served as visiting professor of medicine at Ankara University in 1956, and at Pahlavi University, Shiraz, Iran, in 1962.

In 1966 Francis Lukens retired from the University of Pennsylvania and joined the faculty of the University of Pittsburgh and assumed a senior administrative position at the Pittsburgh Veterans Administration Hospital. He was happily involved in administration and patient care until shortly before his death.

Francis Lukens was a man of superior intellectual gifts. He had a distinguished appearance and manner but a piquant sense of humor and a disdain for pomposity. Despite the august position that he attained in his professional career he was always concerned with efforts to help medical students, patients, and professional colleagues. His life was a model of a gracious and good humored commitent to the obligations of a responsible human being. Francis Lukens was fortunate to be matched in intellectual and personal qualities by his wife, Emma Martyn Lukens, who made a major contribution to the impact that the Lukenses had on each of the institutions and societies with which they were associated during Dr. Lukens' career. Dr. Lukens is survived by his wife, his two daughters and six grandchildren.

Memoir of Michael Scott
1906-1979

GEORGE P. ROSEMOND, M.D.

MICHAEL Scott, M.D., a highly respected member of the College of Physicians of Philadelphia since 1950 and Emeritus Professor and Chairman of the Department of Neurosurgery at Temple University School of Medicine, died at his home in Bala-Cynwyd, April 24, 1979. He had been ill for some time.

"Mike," as he was affectionately known by his many friends, was born August 22, 1906, in Perth Amboy, New Jersey. His first contact with medicine was during World War I when he worked as an errand boy on the wards of nearby Base Hospital #20 in Fox Hills, Staten Island. His pre-medical training was at Rutgers, 1924-1928, after which he entered Jefferson Medical College — later to become Thomas Jefferson University — where he received his M.D. degree in 1932.

He interned at Jersey City Medical Center where he met the future Mrs. Scott. They were married in 1938.

After internship Dr. Scott spent one year (1934-1935) as Resident Physician, New Jersey State Hospital for Epileptics in Princeton, New Jersey. Here he became acquainted with a consultant, Dr. Temple Fay, who was especially interested in the convulsive state. In 1935 he became Temple University's first resident on the service of Dr. Temple Fay, in neurosurgery, receiving his M.Sc. in neurology and neurosurgery in 1939. He remained at Temple as an associate of Dr. Fay.

Dr. Scott's prematurely greying hair, good humor and integrity and unusual skills predicted a rapid beginning to a brilliant career. In 1943 he was appointed Associate Professor in charge of the Department of Neurosurgery at Temple, becoming full Professor and Chairman in 1959, a post he held with distinction until 1973. On January 1, 1979, he resigned as Professor of Neurosurgery due to failing health.

Dr. Scott was a pioneer in his field. His work with Dr. Fay was the basis for much of our present knowledge of hypothermia and cryogenics. His clinical research in cerebrovascular disease, his early developmental work and use of air myelography and cerebral angiography were internationally recognized. He devised a number of neurosurgical instruments and wrote numerous and thoughtful scientific papers. He was a diplomate of both the American Board of Neurology and Psychiatry and the American Board of Neurosurgery, and a Fellow of the American College of Surgeons. He was a member of numerous prestigious medical organizations and served as President of both the Philadelphia Neurological Society and the Mid-Atlantic Neurosurgical Society.

In medicine he combined the humane and the scientific to the ultimate degree. His memory will live in the hearts of those of us who were fortunate enough to know him well.

He is survived by his wife, the former Catherine G. "Billy" Fadde, three sons and a daughter: Drs. R. Michael Scott, Richard Scott, and William L. Scott, and Judith Ann Scott, seven grandchildren, two sisters and a brother.

Two Valuable Journals

. . . and dozens of invaluable services!

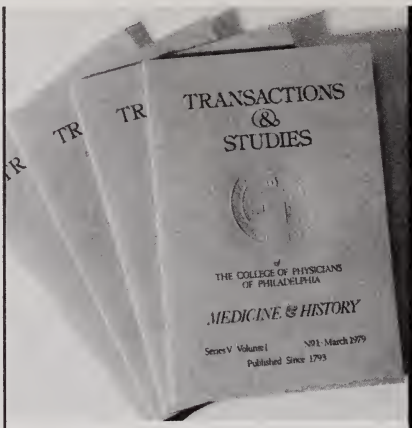
We do many things to help you in virtually every area of Medical communications . . . even help to start your own journal.
Call us.

- ☐ SDI Service—Approximately 1,000 titles in all languages.
- ☐ Data extraction ☐ Literature analysis ☐ In-depth indexing
- ☐ Retrospective Literature Searches
- ☐ Reference service ☐ Photocopy service ☐ Telecopier facsimile document delivery
- ☐ Abstracts—From all languages
- ☐ Translations—From all languages
- ☐ Write, edit, abstract, document, typeset, print, bind, collate—for seminars, medical papers, textbooks, research projects.
- ☐ Prepare and publish journals
- ☐ Data processing, Computer programming, On-line search services

Special attention is given requests for fast service!

Medical Documentation Service

The College of Physicians of Philadelphia,
19 South 22nd Street,
Philadelphia, PA 19103
(215) 563-1238
Alberta D. Berton, Director



Historic journal in New Series!

Transactions and Studies

of The College of Physicians of Philadelphia,

SERIES V

One of the country's oldest medical journals has now become a quarterly journal of Medicine and History. It will contain, in a new, more readable format, papers on historical topics of medical interest, as well as appropriate clinical papers, in the belief that a thoughtful study of the past can offer insight into contemporary medical and related issues. The first issue included subjects as diverse as patent medicines for children and the medical analysis made from contemporary records of the death of an 18th century London watchman after a quarrel with a fellow. Editor of the new series is Ronald F. Kotrc, Ph.D., and Saul Jarcho, M.D., former editor of the Bulletin of the New York Academy of Medicine, is Consulting Editor in Chief.

Published 4 times a year, subscriptions $24.00, foreign $28.00.
Single issues $7.50.

The most complet work of its type— almost 6000 citations of article

The Prostaglandins

Bibliography

SUPPLEMENT 3, 1978

One of the fastest growing subject in experimental medicine! This year's supplement, the third of an annual series, covers almost 600 citations of articles which appear in the 1978 literature from major U.S. or foreign sources on every aspect of the mushrooming, impor tant area of prostaglandins. Co-edited by Dr. James Powell, Jr., the Upjohn Co., and Alberta D. Berton Medical Documentation Service. Citations are alphabetized by author. $29.50 in the U.S.A., $33.50 in other countries. Air mail additional.

American Medicine in the Twentieth Century: Some Personal Insights

CAROLINE BEDELL THOMAS

THE KATE HURD MEAD LECTURE

IT is an honor to give this Kate Hurd Mead Lecture in the history of medicine. It is not only profoundly gratifying, but it affords me the opportunity to salute Dr. Mead, who proclaimed the need for excellence in medicine and who was a pioneer in insisting on the importance of women in American medicine nearly one hundred years ago. Her vision is alive today, and her goals remain ours.

First, a word about the all-inclusive title of my talk. Needless to say, the story of medicine in the twentieth century is not yet over, nor am I omniscient about its first eight decades. Nevertheless, I have been witness to more than half of it from a particular standpoint, with a widening and changing point of view. In the fall of 1926, I entered the Johns Hopkins University School of Medicine and was graduated in 1930. It was then my good fortune to spend three years in residency training in Medicine at the Johns Hopkins Hospital. With the exception of a one-year fellowship at Harvard I have remained in academic medical life at Johns Hopkins ever since.

I can thus personally account for medical life in fifty-three years of this century. Moreover, through symbiosis, my historical view of medicine was extended backward another century when I married Dr. Henry M. Thomas, Jr. in 1934. He was the fourth Baltimore physician and teacher in a direct line: his greatgrandfather, Richard Henry Thomas, Professor of Obstetrics at the University of Maryland Medical School, then his grandfather, Dr. James Carey Thomas, one of the original Johns Hopkins trustees, and then his father, Henry M. Thomas, Sr., Professor of Neurology at Johns Hopkins. So the essence of what medicine used to mean was transmitted down the generations to my husband, and through him, to me.

How can that essence be put into words? Perhaps these two quotations say it best:

1) It is said that Ambroise Paré, the noted French surgeon of the sixteenth century, insisted that, on the wall of every room in his hospital, this sign be placed: "I dressed the wound, and God healed it."
2) Under the portrait of Dr. Edward Livingston Trudeau in the Trudeau

---

Delivered before the Section on Medical History at the College of Physicians of Philadelphia, April 18, 1979, in conjunction with the Medical College of Pennsylvania.

Institute at Saranac Lake are inscribed these words: "To heal sometimes, to help often, to comfort always."[1]

Both sayings express the modesty and seriousness with which a physician of earlier times approached his therapeutic role, accepting the responsibility for the patient's care, attempting by whatever means were then available to restore him to health, but recognizing full well that, all too often, not life, but death, might be the outcome. The physician acknowledged that he was not all powerful, but that God and nature were important participants in the process of healing.

Medicine today is very different, embracing as it does vast new areas of scientific research and the ensuing therapeutic achievements: antibiotics; chemotherapy of hypertension, mental illness, and cancer; cardiac surgery and pacemakers; and organ transplants — to name a few. The physician's role in the care of the patient is no longer seen as that of a wise counselor, but rather as a member of a team of experts, which includes consultants — particularly radiologists, pathologists and cardiologists — the staff of residents, interns, medical students, and nurses, plus an increasing number of ancillary persons such as paraprofessionals and ethicists who now join the more traditional social workers and clergy. The taking of the medical history, the physical examination, laboratory tests, diagnosis, and treatment, previously the province of one doctor, are now divided among the team, and the findings reported (sometimes by computer) to members of the team. All must be brought into harmony by the patient's physician before the diagnostic process is complete and the therapeutic goals determined. In the course of this collaborative effort, days may go by before the decisions are made, and the patient misses the close day-to-day assurance by his own physician, who often has to temporize and thereby may lose his patient's confidence.

In this team approach, it is more important than ever to be *sure* that an essential grain of truth does not slip through the cracks between these many minds. An incident I remember from the early 1930s illustrates this point. On ward rounds one day with Dr. Warfield T. Longcope, the intern presented a patient with a very high fever and some evidence of pulmonary consolidation not characteristic of lobar pneumonia. She was in an oxygen tent. In giving the history, the intern stated that the patient had had *no* exposure to rabbits, parrots, parakeets, or pigeons. Dr. Longcope examined her carefully, replaced the oxygen tent around her head and shoulders, and was plainly puzzled. As we walked away from the bed and down the hall, he suddenly turned, went back, stuck his head under the oxygen tent and asked, "Do you have any love birds?" "Oh, yes, sir", the patient answered, "I *have* love birds!" He found the key to the diagnosis — psittacosis.

The increasing regulation of the practice of medicine and research, both by the

1. Actually inscribed in French: "Guerir quelquefois, Soulager souvent, Consoler toujours" (source unknown).

government and by the medical profession itself, has greatly changed the way we can do things. Not long ago I was walking down the hospital corridor and passed two young physicians in earnest conversation. As I passed I heard her say to him: "In the good old days, when there was freedom..." I didn't hear the rest, but was amazed that anyone so young had already felt the mounting effect of medical restrictions.

Two important phases of my own medical life show this contrast. In the fall of 1935, when I was a young instructor in the Department of Medicine, Dr. Longcope asked me to start an adult cardiac clinic. "But, of course," he said, "don't take the interesting teaching cases away from the General Dispensary," by which he meant patients with severe aortic insufficiency, mitral stenosis, and so on. Because of my fundamental interest in physiology, the very early stages of cardiac disease seemed well worth investigating. Among the patients I decided to observe were young people with a history of rheumatic fever, but with minimal rheumatic heart disease. During the ensuing year I kept asking myself, "What can we do for these young patients? How can we interrupt the rheumatic cycle?"

It was in September, 1936, that the answer came. Dr. Perrin Long had just returned from a conference in London, where the nearly miraculous capability of sulfanilamide to cure beta hemolytic streptococcal infections had been described. Dr. Long told about it at lunch one day, and added, off-hand, that when *smaller* doses were injected into the peritoneum of a mouse *before* it was inoculated with the streptococcus, *no* infection ensued. Others at the table were caught up in the exciting prospects of treating and curing such dire streptococcal infections as meningitis, mastoiditis, otitis media, pneumonia, scarlet fever, and so on, but not I. This new drug offered just the opportunity I'd been looking for: a way to intervene in the rheumatic cycle by *preventing* beta hemolytic streptococcal infections, which Alvin Coburn thought always preceded the rheumatic state. After lunch I stopped Perrin in the corridor and asked what he thought the correct *prophylactic* dose of sulfanilamide for patients would be. He thought a moment, extrapolating the dosage from mouse to man in his head, and then said, "I think a gram a day would be about right." It was exactly right!

In our Cardiac Clinic, Dr. Richard France and I immediately began to test the double hypothesis:

1) that sulfanilamide would prevent beta hemolytic streptococcal infections in man as it did in the mouse, and
2) that, in the absence of such streptococcal infections, recrudescences of acute rheumatic fever would not appear.

In October, 1936, within a month of Dr. Long's report from England, we started preventive treatment. Over the next four years, this prophylatic use of sulfanilamide in patients susceptible to rheumatic fever was highly successful. Not a single major attack of acute rheumatic fever occurred in the treated group during seventy-nine person-seasons, in contrast to the experience in the

untreated control group, in which fifteen major episodes occurred during 150 person-seasons. If a similar rate of attack had been present in the treated group, eight episodes would have been expected, yet there were actually none. This difference was highly significant statistically, since the treated and control groups were shown to be comparable in terms of age, intelligence, nutrition, and housing, and were also similar in respect to recent history of major rheumatic episodes, amount of valvular heart disease, and degree of cardiac enlargement. Although the total number of subjects was not large, the fact that the same differential in attack rate was found each year for four years in a row strengthened the conclusion that prophylactic sulfanilamide played the crucial role in the result.

All this was accomplished in an incredibly simple way. The Cardiac Clinic was held two mornings a week in dispensary quarters. We had the help of a hospital nurse; the two social workers were volunteers. We had no money, no grant. Dr. Richard France and I, both part-time members of the faculty who were expected to make our own livings outside of the hospital, received no salaries for this project. Patients who could pay something toward their clinic visit and the few laboratory tests did so; otherwise the hospital paid. We received our sulfanilamide free from the Winthrop Chemical Company through Dr. Perrin Long. When, at the end of our first year of apparent success, I applied to the medical school for a $500 grant in order to make more extensive laboratory tests, it was refused. We had no ongoing supervision, except when Dr. Longcope told me that we could not publish our results at the end of the first year, as it would be premature. There were no Food and Drug Administration restrictions or insistence that animal testing be done in this country before we proceeded to prevent rheumatic fever in patients. Today this seems like a rather rash undertaking, but the logic was as follows: if the new drug was being widely used in very much greater dosage in the *treatment* of human disease, our relatively tiny prophylactic doses could hardly be expected to be dangerous.

Actually, I had to fight for the concept of the prophylactic use of sulfanilamide on three fronts: first, Dr. May Wilson, an authority on rheumatic fever in childhood, did not believe that the beta hemolytic streptococcus *had anything to do* with the occurrence of rheumatic fever; second, Dr. Homer Swift and Dr. Duckett Jones, eminent men in the fields of rheumatic fever and rheumatic heart disease, had *treated* patients with acute rheumatic fever with large doses of sulfanilamide in attempts to cure them, and reported the appearance of such symptoms as nausea and vomiting. This, plus the fact that the drug did the acute rheumatic fever itself no good, made them give repeated, emphatic warnings to *avoid* sulfonamide prophylaxis; and finally, there were always those who insisted the drug was too toxic, especially when given over long periods. Fortunately, this did not turn out to be the case.

With the advent of World War II, the Armed Forces turned towards a new sulfonamide derivative, sulfadiazine, to prevent beta hemolytic streptococcal infections from sweeping through the training camps, where large groups of young men were living in close quarters, and also to *prevent acute rheumatic fever*. Between December 1, 1943, and March 1, 1944, about a quarter of a million men in the United States Navy received a gram of sulfadiazine daily, while an equal number at the same centers served as controls. Commander Alvin F. Coburn directed this most extensive program of mass prophylaxis. Before the end of the War, half a million men took prophylactic sulfadiazine daily at one time or another, with very rare toxic reactions. The U.S. Army and U.S. Air Force conducted similar but less extensive trials. An overview by Rosenberg and Hench concerning recent advances in the treatment of rheumatic fever, with special reference to sulfonamide prophylaxis, was published in 1946. Summing up nine years of experience by many workers between 1936 and 1945, they concluded that the results of sulfonamide prophylaxis of rheumatic fever, in both civilian and military life, left no doubt that an effective new way had been found to prevent rheumatic fever.

Experience in World War II was the hinge upon which the future of American medicine turned. Thousands of civilian doctors entered the Armed Forces, leaving their personal patient-physician relationships behind them and working under government regulations all over the world. After the war there was a veritable outburst of change — change in medical school faculties, with full-time appointments taking precedence over physicians in private practice as part-time teachers, with both changes in teaching to keep pace with the increasing complexity of diagnosis and the proliferation of sophisticated tests leading to the *conference* as the focal point rather than bedside teaching, although the latter continues. With the premium on bed space and in the presence of rising costs, patients stayed in the hospital for a minimum time, so that the bond between physician and patient was weakened futher. Whereas before the war the patient knew little or nothing about his disease and its treatment except what his doctor told him, now he began to be bombarded with information, both correct and incorrect, about his disease from all sides — newspapers, tabloids in supermarkets, health books, magazines, television and radio, making him both fearful and doubtful of the wisdom of his own physician.

Meanwhile, antibiotics were making a clean sweep of the acute infectious diseases, so that former common causes of death such as lobar pneumonia and tuberculosis have been replaced by new ones — accidents and suicide in youth, and coronary heart disease, stroke, and cancer in the middled-aged and elderly. No longer is pneumonia considered to be the "old man's friend." Rather, the moribund patient is inexorably sustained by artificial means and the physician is forbidden to shorten the dying patient's life.

The notable success in eradicating infectious disease by antibiotics (pneumonia), vaccines (smallpox and polio), and antisera (diphtheria, rubella, measles, tetanus, and so on) led to the general belief in what might be called "the infectious disease model," in which there is *one* cause and *one* effect which can be prevented or cured by a *single* preventive or therapeutic agent. This aroused the great hope that chronic disease could be abolished similarly if the "cause" of each disorder could be found. Thirty years of intensive research have so far failed to come up with a basic single "cause" for heart attacks or cancer, however, and it is time to consider another model, which I shall call the "kaleidoscope model." *Many* factors enter into this psychobiological model which, together, lead to the development and finally the appearance of disease. The particular configuration of factors in each individual determines the *nature* of the disease process, whether the disorder appears early in life or late, and whether it is or is not life-threatening. Some of the factors which contribute to the ultimate kaleidoscopic pattern are life-long and stem from genetic endowment. Others enter the life-design early as the result of congenital influences or particular physical or emotional experiences in childhood. Along the way, still other factors, potentially protective *or* destructive, enter the picture. These include environmental hazards and behavioral factors such as habits of smoking and drinking, diet and exercise, compounded over the years. "Life-style" and "stress," though ill-defined, are often referred to as potentially sinister influences. Finally, there may be a particular situation or event in early middle age, or even in young adulthood, which turns the kaleidoscope a little more, so that a pattern of disease emerges. This does not mean that there is a single pattern for cancer and another for heart attack. Rather, it means that kaleidoscopic fragments relating to vulnerability come together and over-balance those relating to stamina and health, so that a general pathological pattern is formed. Particular pieces in the pattern then determine the nature of the disease process that ensues.

Right after World War II, with the kaleidoscope model in mind, I undertook a long-term prospective study, now known as the Precursors Study. Under Dr. Longcope's tutelage, I had learned the importance of observing the natural history of disease by following individual patients on a longitudinal basis. In fact, the very first patient I ever presented to Dr. Longcope when I was a medical student was a young woman who had had something like fourteen admissions for acute episodes of glomerulonephritis. Terrified by the thought of summarizing her thick two-volume history, I constructed a gigantic chart of her blood pressure, edema, retinal changes, blood, urine, and other laboratory findings over time, which I unrolled at the critical moment. That chart may well have earned me my internship in medicine!

The aim of the Precursors Study was to identify youthful precursors of hypertension and of coronary heart disease, or both, by recording a broad range of the genetic, physiological, psychological, and metabolic characteristics of over a

thousand Johns Hopkins medical students in good health and following them until the appearance of disease. Then, by looking back, the youthful characteristics in each individual which had preceded the appearance of premature disease could be determined and lead to a better understanding of possible approaches to prevention.

With the help of many people, the plan was designed, implemented and carried forward without interruption over a 33-year span. Our initial grant application was submitted to the U.S. Public Health Service in May, 1946. Now the former medical students are, for the most part, physicians in their 40s and 50s. Of the original 1,337 subjects, at least 86 have developed hypertension or coronary heart disease, and 60 have died of all causes.

What have we learned from this investigation?

1) That it is possible, though difficult, to do it — that is, to carry out a prospective study continuously for more than 30 years.
2) That when subjects were stricken by other serious disorders — cancer, suicide and mental illness (in addition to our original targets, hypertension and coronary disease) — both their youthful *psychological* and *biological* characteristics provided clues to these future disease states, also.

For example, both high cholesterol levels and depression uner stress preceded coronary occlusion by 20 years. Those who have committed suicide had shown not only special psychological characteristics as medical students, but biological differences as well, compared with their now living classmates. Students who later developed cancer checked items in a Family Attitude Questionnaire which indicated a lack of closeness to their parents in childhood. In this characteristic, they resembled the suicides and the mental illness group, but did not resemble either classmates who remained healthy, or those developing hypertension or coronary heart disease. Finally, the global concept of types of temperament seems to be predictive of premature disease, on the one hand, or health, on the other.

In this sustained endeavor, unlike our experience with the chemoprophylaxis of rheumatic fever, the Precursors Study has, for the most part, been supported by government grants. Because the policies of government agencies are constantly shifting, however, our central support has come successively from the U.S. Public Health Service, the Veterans Administration, the National Heart Institute, the Tobacco Industry Research Committee, the National Institute of Mental Health, and the National Cancer Institute. There is no agency that considers the causes of all kinds of disease states at once. There is no institute which can assure support for more than a year at a time. We are constantly monitored through formalized, time-bound requests for progress reports and applications for continuation grants. In addition to the need for submitting and renewing applications for new grants, we must make affidavits concerning the protection of human subjects and, from time to time, must undergo project site visits. While some such monitoring

is probably necessary, it imposes huge costs in terms of time and effort, not only on us, the investigators, but on the scientists who form the advisory committees that read our applications, sit on Study Sections and Councils, and make site visits, yet are themselves among the best medical teachers and investigators in the nation.

Before ending, I must make a personal comment about women in medicine as I have known them. Unlike the current belief that women are coming into their own in medicine for the first time today, there was a time in this century when, although their numbers were not large, women entered medical schools with feelings of eagerness and freedom rather then a sense of inferiority. They enjoyed the human values and adventures they encountered in medical school, and went on to become humane and durable teachers and practitioners of medicine. This period of time began after World War I and lasted through the 1920s. To illustrate this era, when women had high expectations for themselves in medicine, many of which were realized, let me cite the experience of my own class at Johns Hopkins — the class of 1930. Eight of the seventy-one entering students were women. None dropped out along the way, four more women entered on advanced standing, and twelve women graduated. All were continuously active in medicine, although six were married and had some twelve children among them (at least three of these children are now doctors). Of the five who took the academic road, three, Hattie Alexander, Rosa Lee Nemir, and I, became full professors in pediatrics and medicine at Columbia, New York, and Johns Hopkins Universities, respectively. Ann Kuttner, Associate Professor of Pediatrics at New York University who had received a Ph.D. in bacteriology from the Rockefeller Institute before Medical School, became the Head of Irvington House, where she was an authority on the relation of the beta hemolytic streptococcus to acute rheumatic fever. Miriam Brailey, who combined Public Health with being Assistant Professor of Pediatrics at Johns Hopkins, wrote a seminal book on childhood tuberculosis. Several who went into private practice were associated with teaching hospitals; of these, Jane Lockwood and Jean Davidson also became chiefs of service of medicine and of pediatrics, respectively, in non-teaching hospitals. Alice Lilian Gilbert practiced pediatrics and was Assistant Professor of Clinial Pediatrics at New York University. Florence Clothier practiced child psychiatry and later became Assistant to the President of Vassar College. Katherine Kuder went into obstetrics and gynecology and directed family planning in India. Gertrude Turner, who went into public health and pulmonary disease, became Associate Clinical Professor of Medicine at the University of California School of Medicine (Los Angeles), where she was assistant director of the UCLA Student Health Service. Dorothy Adams became assistant director of the Children's Bureau. Many of us received a number of honors and awards.

Jane Lockwood, the classmate who was chief of medicine at a distinguished hospital for ten years, wrote me, in part:

> I went to the New York Hospital and was the only woman on the House staff...One of our duties was to ride ambulance in the area known as 'Hell's Kitchen.' This gave us a very good background in the seamy side of life as well as teaching us to make quick decisions as to diagnosis and disposition.
>
> There was absolutely no prejudice against me as a woman that I was aware of...We received no remuneration for our services until we reached residency level, when we were paid $25 a month.
>
> In 1933 I opened my practice in Internal Medicine in Greenwich, Conn. It was the height of the depression and my earnings the first year were $1200.00. I never fully recovered from this background or the feeling that it was bad enough to be sick without being charged high fees by the doctor as well...
>
> The doctors of my vintage made house calls and night calls on demand, as well as carrying their office and hospital duties. Parenthetically, I am sorry to see the house calls disappear from a doctor's life since they brought the patient and doctor closer together and provided information for the doctor not otherwise obtained.

In all, it seems to me that this group of women, who entered medicine over fifty years ago with self-confidence and stamina, although at times encountering road blocks that necessitated some broken-field running, led useful, productive and satisfying professional lives.

I believe that Kate Hurd Mead would have been proud of the Hopkins women in the class of 1930, as we are proud of her.

Department of Medicine
The Johns Hopkins University
School of Medicine
Baltimore, Maryland

A Bibliography of the Galenic Corpus

A Newly Researched List and Arrangement of the Titles of the Treatises Extant in Greek, Latin, and Arabic

RONALD F. KOTRC and K. R. WALTERS

1. Origins

GALEN was the most prolific writer of classical antiquity. In modern times nearly three million words of Greek are attributed to him. Of these over 2.6 million comprise works considered genuine. Yet many treatises were wholly lost in the transmission from antiquity, and still others survive only in Latin or Arabic translation. In medical writing Galen excelled not only in fecundity but also in authority and knowledge: he was the most famous and influential of the ancient physicians, and respect for his science survived until the nineteenth century and the advent of modern medicine. Since the birth of *Altertumswissenschaft* his writings have been closely, though still insufficiently, edited and studied by classical philologists and historians of ancient medicine.

So great is the bulk of Galen's writings surviving today and so many the works attributed to him that there still exists no single complete or systematic recension. Kühn's nineteenth century assemblage is a farrago of pirated earlier editions, clumsily thrown together, indiscriminate in attribution, spoiled with frequent printing errors and replete with manifold textual cruces. Yet it retains the honor of being the fullest collection available of Galen's work. Better recensions of many of the treatises hide in obscure or difficult to obtain editions, some buried in now scarce periodicals, others in little known or poorly printed doctoral dissertations. And the laudable recensions of Teubner or of the *Corpus Medicorum Graecorum* inaugurated by such as Helmreich, Müller, or Kalbfleisch still have not covered this lacuna. The bibliographies abound in Greek titles that promise Greek texts but that reveal upon investigation medieval Latin or Arabic translations as the sole extant vehicles of Galenic treatises. The frustrated Bardong (1937) could not restrain himself from deceptively retranslating into his own ancient Greek Nicolaus Reginus' Latin version of the now lost original of *De causis procatarcticis;* the hasty reader could easily be misled. In the course of centuries many works acquired several different Greek and Latin titles, and bibliographies still claim works that upon scrutiny materialize as more familiar treatises under another name. Finally, Galen's bibliographers, impatient with perusing the actual editions, many inaccessible, unhappily copied their predecessors' errors in reference and citation. Thus, the unwary neophyte and even the veteran of Galenic research often trustingly succumb to these unintended deceptions.

The need for an accurate and systematic bibliography to Galen's writings is clear. No less clear are the difficulties and dangers in compiling it. In the work before you we offer what we hope to be a useful and accurate Galenic bibliography. We are heavily indebted to the labors and learning of our forerunners. Without their efforts our recent task would have been many times more difficult, and by avoiding their occasional faults and lapses we endeavor to improve upon their accomplishments.

The result of our researches still bears the impress of their practical origin and owes much to its impetus and fostering. At the same time that origin has imposed its limitations upon our work: most of all this bibliography cannot pretend to be a complete or exhaustive catalog of Galenic works. Instead, it presents for each Greek treatise a best edition and certain other useful information. And its main claim is modest, to sort out a canon for those treatises associated from antiquity with Galen and to order the hitherto confusing welter of titles in Latin and Greek.

The *Thesaurus Linguae Graecae,* located at the University of California, Irvine, has an essential goal to compile a computer data base of all the extant works of Greek authors from Homer to A.D. 600. Aided by a grant from the National Endowment for the Humanities, the *TLG* began in the summer of 1974 the task of assembling, preparing, and entering onto computer tape all the known works of the ancient medical writers that still survive in Greek texts. Since the opera of Galen comprise approximately half of the bulk of those texts, his work required primary attention.

A committee of the American Philological Association formed to advise the *TLG* on the text selection recommended that the 1821-1833 Kühn edition be used as the basis for data entry. Where better editions than those in Kühn could be found these were to be preferred. Dr. Hans Diller was especially helpful in indicating suitable recensions. Where Kühn lacked texts, we necessarily sought independent editions. The bibliographies of Ackermann, Schubring, Leitner, and Christ-Schmid-Stählin were closely studied. Queries to scholars brought further valuable suggestions. Since the *TLG* was to prepare the texts for coding into machine-readable form, we required actual printed editions or their facsimiles. In our researches we thus discovered how difficult it indeed was to get accurate information. Where our predecessors had sometimes been content to trust the authority of others, we had in fact to collect and inspect every text. This necessity had special advantages. First, the need for an orderly and accurate Galen bibliography became clear, and it was decided to produce the present work as an extension of the *TLG*'s researches. Secondly, all the texts mentioned in our bibliography have actually been consulted, even the most obscure or difficult to obtain.

It is our purpose to list all works attributed to Galen, both those in Greek which have been entered into the *TLG* data base and those which are merely Latin or Arabic translations of now lost Greek originals. But only those recensions of the

Greek that were actually used for data entry are given as text references; other editions are not listed. This is the case even where a popular Galenic work may have several different editions. The text chosen for data entry was so selected for the value of its recension by the *TLG* staff in consultation with other scholars. In this respect, certainly, the bibliography is not complete. But it is economical in citation and offers reference to good editions. Scholars will have little trouble in finding other editions, if desired, of the widely read works of Galen. Very often the texts of the more obscure treatises used by the *TLG* are the only editions that exist at all.

Of the numerous works attributed to Galen, it is clear that many are spurious. Some of these were early works falsely or unintentionally attributed to the master. Others are deliberate later forgeries. In preparation for data entry it was necessary for the *TLG* to make a determination of authenticity for each work. Often it was possible to rely upon the judgment of scholars who have devoted long years to careful study of the ancient medical writers. Our criterion in the preparation of this bibliography has been to call a work spurious, if there was much doubt about its authenticity, even though some scholars might consider it genuine. As elsewhere in classical scholarship, such questions will always remain open, and certainty cannot be achieved. In pragmatically determining Galen's canon we claim no special insight or certainty. In any case, works thought spurious were entered into the data base as well. Such treatises are registered under different author and work codes as explained below.

2. *Arrangement of the bibliography*

The main part of this bibliography is a list of works attributed to Galen, arranged alphabetically according to key words in those Latin titles for each work which usage has sanctioned. Although the treatises were of course written in Greek, Latin titles are preferred, since it is by them that scholars most commonly designate the works. It is necessary for two reasons to choose a key word for each title. First, many titles are lengthy and need a convenient tag. Secondly, many are similar in subject and hence can be conveniently grouped in this way. Too, the entire Galenic corpus is so large that it is unwieldy. Key word arrangement thus makes the use of bibliography much easier. Examples are the works keyworded HIPPOCRATES, VENA, or MEDICAMENTUM. When there are several works with the same key word, a second key word is selected for each. These works are then listed alphabetically by this second word. The best instance of this is the twenty-six treatises containing in their titles some form of HIPPOCRATES, arranged from AER to VICTUS. Those words in all cases were selected as keys which best describe the topic of the treatises. Care was taken to choose key words consistently.

Other Latin titles ascribed to texts but considered less common are listed beneath the base title, enclosed in brackets. As these titles may be considerably

different from the base title, they are keyed independently. A good example is *ADHORTATIO ad artes addiscendas,* with alternate titles listed in brackets beneath it as [*SUASORIA ad artes oratorio*] and [*PROTREPTICUS*]. In *INDEX I* all bracketed alternate Latin titles are listed alphabetically and cross-referenced as an aid to one searching for a work in the bibliography under a rubric not designated a base title in this work. Hence, in our example, the reader looking for [*PROTREPTICUS*] or [*SUASORIA ad artes oratorio*] will find either one in its appropriate alphabetical place in *INDEX I* and be referred thence to the base title, *ADHORTATIO ad artes addiscendas*. In similar fashion, beneath the Latin titles are listed the corresponding Greek titles. In some cases these answer exactly their Latin equivalents and are listed in the same order. In other cases, there is not equivalency between Greek and Latin captions. Here the Greek titles are arranged alphabetically according to key word. All these can be found in *INDEX II,* also arranged alphabetically according to key word and cross-referenced to the Latin base title.

Wherever a text has been entered into the *TLG* data base its *TLG* identification code is given. This code consists of two parts, a four digit author number followed by a three digit work number. Both of these are prefixed by the acronym *TLG.* Latin, Arabic, or spurious Greek works that are Renaissance forgeries are not in the data base and hence have no code. On the other hand, spurious classical texts are in the data base and hence are coded. These are given a special identifying author number. The author number for a genuine Galenic treatise is 0057; for a spurious work, 0530. All ancient works in the *TLG* data base are coded in similar fashion. Thus, should a reader require a computer generated facsimile or a machine readable text of a given work from the *TLG* he can order it by using the appropriate code. In some cases, *TLG* concordances to Galenic works have been produced and can similarly be requested. As an additional aid, all Latin, Arabic, or Renaissance Greek works are indicated by appropriate bracketed *sigla,* [L], [A], [R]. It should be noted that many Latin or Arabic texts are not spurious: indeed, they may be the only extant vehicles of now lost genuine works. But in those cases where the Latin or Arabic versions are apocryphal, there is a further identifying *siglum,* [Ps], to indicate this status. An example is *de ANATOMIA oculorum,* marked as [Ps] [L]. Finally, when treatises are considered spurious, reference is commonly made in the bibliographic entry beneath the title to the authorities giving this judgment. Hence, in the present example, *de ANATOMIA oculorum* has the entries under A and S that refer to the bibliographic studies of Ackermann and Schubring.

As mentioned, the *TLG* was mandated by the *APA* advisory committee to use the best possible redactions of the Galenic corpus available. In many instances, this was the Kühn text, which is indicated by the abbreviation K, followed by the volume number in Roman numerals, pagination in Arabic; if so, the *TLG* code is entered directly below. In many other cases better recensions were available; here

the *TLG* code precedes their references. But wherever a Kühn text exists for a work, even be it supplanted by that new edition, the Kühn reference is still given, directly following the titles, in brackets. We adopt this practice to aid the user, since, even when better recensions exist, scholarly reference is to the Kühn edition.

In what we have done our purpose has been clarity and ease of reference for the user. We have striven for the greatest accuracy, carefully examining each text. In most cases there have been cited only those texts which derive in Greek from antiquity, and only those editions which were entered into the *TLG* data base. Despite this limitation we feel the bibliography is a useful extension of the work of earlier scholars. What is good in this work credits the many others whose patient labor underlies it; we take complete responsibility for what is obscure or lacking in it.

REFERENCES

Ackermann, J. C. *Historia Literaria Claudii Galeni: Conscripta ex Jo. Alb. Fabricii Bibl. Graec. LX ed. Gli. Cph. Harles, vol. V. p. 377-500. Desumta et hinc inde aucta et amendata.* Kühn ed., vol. 1, pp. XVII-CCLXV.

Christ, W. von. *Wilhelm von Christs Geschichte der griechischen Litteratur.* Unter Mitwirkung von Otto Stählin...bearbeitet von Wilhelm Schmid .... 6th ed. 3 vols. Munich, 1912-24.

Durling, R. J. "A Chronological Census of Renaissance Editions and Translations of Galen," *Journal of the Warburg and Courtauld Institutes* 24, nos. 3-4, 1961; reprint ed. Worcester, England: E. Baylis, 1961.

Kühn, C. G., ed. *Claudii Galeni Opera Omnia.* Leipzig, 1821-1833, reprint ed., Hildesheim: Georg Olms Verlagsbuchhandlung, 1965. 20 vols.

Leitner, H. *Bibliography to the Ancient Medical Authors.* Bern: Hans Huber, 1973.

Schubring, K. *Bemerkungen zu der Galenausgabe von Karl Gottlob Kühn und zu ihrem Nachdruck. Bibliographische Hinweise zu Galen.* Offprint from *Claudii Galeni Opera Omnia,* vol 20, Hildesheim: Georg Olms Verlagsbuchhandlung, 1965. (Reprint of Kühn edition).

Marquardt, I., Mueller, I., and Helmreich, G., eds., *Claudii Galeni Pergameni Scripta Minora.* Leipzig: Teubner, 1884; reprint ed., Amsterdam: Hakkert, 1967. 3 vols.

SIGLA

[A]	Arabic
[Ex]	Excerpt
[Fr]	Fragment
[L]	Latin
[NE]	Not extant
[Ps]	Pseudo Galen
[R]	Renaissance
AGM	Archiv für Geschichte der Medizin
BT	Bibliotheca Teubneriana
CMG	Corpus Medicorum Graecorum
GP	Gymnasium Programmschrift
K	Kühn
SM	Scripta Minora
Ack.	Ackermann
D.	Durling
L.	Leitner
Sch.	Schubring

THE GALENIC CORPUS

▶ ADHORTATIO ad artes addiscendas
[SUASORIA ad artes oratio]
[PROTREPTICUS]
ΠΡΟΤΡΕΠΤΙΚΟΣ ἐπὶ ἰατρικήν
[ΠΡΟΤΡΕΠΤΙΚΟΣ ἐπὶ τὰς τέχνας]
[Γαληνοῦ παραφράστου τοῦ Μηνοδότου ΠΡΟΤΡΕΠΤΙΚΟΣ λόγος ἐπὶ τὰς τέχνας]
[K I 1-39]
TLG 0057 001
Wenkebach, E., "Galens Protreptikosfragment," *Quellen und Studien zur Geschichte der Naturwissenschaft und Medizin,* 4 (1935) 90-121.

▶ de causa AFFECTIONUM
περὶ αἰτίας ΠΑΘΩΝ
TLG 0530 001
Helmreich, Georg, "Handschriftliche Studien zu Galen." GP, Ansbach 1910/11, 1-45.
[Ps]

▶ de ALIMENTORUM facultatibus libri III
περὶ ΤΡΟΦΩΝ δυνάμεως
[K VI 453-748]
TLG 0057 037
CMG V 4, 2, 200-386. Leipzig and Berlin 1923, ed. G. Helmreich.

▶ de ANATOMIA oculorum
[Ps] [L]
Ack. CLXI.104; Sch. LX; D. 14

▶ de ANATOMIA parva
[L]
D. 15

▶ de ANATOMIA vivorum
[Ps] [L]
Ack. CLX.104; Sch. LX; D. 16

▶ de ANATOMICIS administrationibus libri I-IX, 5.
περὶ 'ANATOMIKΩN ἐγχειρήσεων
K II 215-731
TLG 0057 011
[A]
Libri IX, 6-XV preserved only in Arabic.

▶ de ANIMA
περὶ ΨΥΧΗΣ
TLG 0743 001
Fragmentum ex cap. 2 libri Nemesii *de Natura Hominis.* CMG text in typescript, ed. B. Einarson, pp. 86-92.
[A]
The rest is preserved only in Arabic.

▶ an ANIMAL sit quod est in utero
[an ANIMAL sit id quod in utero inest]
εἰ ΖΩΟΝ τὸ κατὰ γαστρός
[K XIX 158-181]
TLG 0530 002
Wagner, H. Galeni qui fertur libellus "Εἰ ζῶον τὸ κατὰ γαστρός." Diss. Marburg 1914.
[Ps]

▶ de ANIMALIBUS
περὶ ΖΩΩΝ
[NE]
Sch. LX

▶ an omnes partes ANIMALIS quod procreatur fiant simul
[L]
Ack. CL.88; D.6

▶ de cuiuslibet ANIMI peccatorum dignotione atque medela libellus
[de ANIMI cuiuslibet peccatorum dignotione et curatione]
[de ANIMI cuiuslibet peccatorum dignotione et medela]
περὶ διαγνώσεως καὶ θεραπείας τῶν ἐν τῇ ἑκάστου ΨΥΧΗΙ ἁμαρτημάτων
[περὶ τῶν ἰδίων ἑκάστῳ ΠΑΘΩΝ καὶ ἁμαρτημάτων τῆς διαγνώσεως]
[K V 58-103]
TLG 0057 029
CMG V 4, 1, 1. Leipzig and Berlin 1937, 41-68, ed. W. De Boer.

▶ de propriorum ANIMI cuiuslibet affectuum dignotione et curatione
[de cognoscendis curandisque ANIMI morbis]
περὶ διαγνώσεως καὶ θεραπείας τῶν ἐν τῇ ἑκάστου ΨΥΧΗΙ ἰδίων παθῶν
[K V 1-57]
TLG 0057 028
CMG V 4, 1, 1. Leipzig and Berlin, 1937, 1-37, ed. W. De Boer.

▶ quod ANIMI mores corporis temperamenta sequantur
ὅτι τὰ τῆς ΨΥΧΗΣ ἤθη ταῖς τοῦ σώματος κράσεσιν ἕπεται
[K IV 767-822]
TLG 0057 027
SM II, 32-79, ed. Iwan Müller

▶ de ANTIDOTIS libri II
περὶ 'ΑΝΤΙΔΟΤΩΝ
K XIV 1-209
TLG 0057 078

▶ ARS medica
[ARS parva]
ΤΕΧΝΗ ἰατρική
K I 305-412
TLG 0057 007

▶ an in ARTERIIS natura sanguis contineatur
[an sanguis in ARTERIIS natura contineatur]
εἰ κατὰ φύσιν ἐν 'ΑΡΤΗΡΙΑΙΣ αἷμα περιέχεται
[K IV 703-736]
TLG 0057 023
Albrecht, F., *Galeni libellus An in arteriis natura sanguis contineatur,* Diss. Marburg 1911.

▶ de atra BILE
περὶ μελαίνης ΧΟΛΗΣ
[K V 104-148]
TLG 0057 030
CMG V 4, 1, 1. Leipzig and Berlin 1937, 69-93, ed. W. De Boer.

▶ de CATHARTICIS
[Ps] [L]
Ack. CLXXII; L. 34; D. 24

▶ de virtute CENTAUREAE
[Ps] [L]
Ack. CLXXI.141; D. 128

▶ de CLYSTERIBUS et colica
[de CLYSTERIBUS et de colico dolore]
[de COLICO dolore]
[Ps] [L]
Ack. CLXXII.124 & 142; Sch. LX; L. 34; D. 26

▶ de CONSTITUTIONE artis medicae ad Patrophilum
περὶ ΣΥΣΤΑΣΕΩΣ ἰατρικῆς πρὸς Πατρόφιλον
K I 224-304
TLG 0057.006
N.B.: de PRAENOTIONE
[de PRAESAGITURA]
περὶ ΠΡΟΓΝΩΣΕΩΣ
K XIX 497-511 = pp. 289-304 *of de CONSTITUTIONE artis medicae.* The TLG has not made a separate entry of *de PRAENOTIONE*

▶ praeceptum Galeni de humani corporis CONSTITUTIONE; de DIAETA quattuor anni tempestatum et duodecim mensium
διαθήκη περὶ τῆς τοῦ ἀνθρωπείου σώματος ΚΑΤΑΣΚΕΥΗΣ. περὶ τῆς τεσσάρων τῶν ὡρῶν τε καὶ ιβ΄. μηνῶν ΔΙΑΙΤΗΣ
[Ps]
Ack. CLXII

▶ de optima corporis nostri CONSTITUTIONE
περὶ ἀρίστης ΚΑΤΑΣΚΕΥΗΣ τοῦ σώματος ἡμῶν
[K IV 737-749]
TLG 0057 024]
G. Helmreich, *Gal. De optima corporis nostri constitutione.* GP, Hof 1901, pp. 7-16.

▶ de CONSUETUDINIBUS
[de CONSUETUDINE]
περὶ ’ΕΘΩΝ
TLG 0057 103
SM II 9-31, ed. Iwan Müller

▶ de causis CONTINENTIBUS
[de causis CONTENTIVIS]
περὶ τῶν ΣΥΝΕΚΤΙΚΩΝ αἰτίων
[Ps] [A] [L]

▶ de homoeomereis CORPORIBUS
[de partium homoeomerium DIFFERENTIA]
[A]
Ack. CXCIV; Sch. LVII; L. 21

▶ de virtutibus nostrum CORPUS dispensantibus
[de facultatibus CORPUS nostrum dispensantibus]
[Ps] [L]
Ack. CLXII.109; L. 21; D. 129

▶ de CRISIBUS libri III
περὶ ΚΡΙΣΕΩΝ
[K IX 550-768]
TLG 0057 064
B. Alexanderson, *Galenos:* ΠΕΡΙ ΚΡΙΣΕΩΝ. Ueberlieferung und Text. *Studia Graeca et Latina Gothoburgensia* 23 (Göteborg, 1967).

▶ de diebus DECRETORIIS libri III
περὶ ΚΡΙΣΙΜΩΝ ἡμερῶν
K IX 769-941
TLG 0057 065

▶ DEFINITIONES medicae
[DEFINITIONES medicae ad Theutram scriptae]
Ὅροι ἰατρικοί
K XIX 346-462
TLG 0530 041
[Ps]

▶ de DISSOLUTIONE continua
[de VIRTUTIBUS cibariorum]
[liber REGIMINIS]
[Ps] [L]
Ack. CLXII.100: Sch. LXII; D. 45

▶ de optima DOCTRINA
[de optimo DOCENDI genere libellus]
[de optima DOCTRINA ad Favorinum]
περὶ ἀρίστης ΔΙΔΑΣΚΑΛΙΑΣ
[K I 40-52]
TLG 0057 002
SM I 82-92, ed. I. Marquardt

▶ de DYNAMIDIIS
1. Fragmentum libri primi *de DYNAMIDIIS* a Galeno
2. Liber secundus *de DYNAMIDIIS*
[Ps] [L]
Ack. CLXIX.135 [136]; D. 41, p. 285

▶ sermo contra EMPIRICOS
[sermo adversus EMPIRICOS medicos]
[Fr] [L]
Ack. CLXXIII.6; D. 147

▶ pro puero EPILEPTICO consilium
[de puero EPILEPTICO]
τῷ ΕΠΙΛΗΠΤΩΙ παιδί ὑποθήκη
[K XI 357-378]
TLG 0057 074
Keil, W., *Galeni puero epileptico consilium. Diss. Göttingen* 1959.

▶ de EXPERIENTIA medica
περὶ τῆς ἰατρικῆς 'ΕΜΠΕΙΡΙΑΣ
TLG 0057 107
R. Walzer, *Galen. On Medical Experience.* Oxford, 1944. Greek text on pp. 93-96, 113-114.
[Fr. Greek] [A]
The remainder of text survives in Arabic only.

▶ de naturalibus FACULTATIBUS libri III
περὶ φυσικῶν ΔΥΝΑΜΕΩΝ
[K II 1-214]
TLG 0057 010
SM III 101-257, ed. G. Helmreich

▶ de FASCIIS
περὶ τῶν ’ΕΠΙΔΕΣΜΩΝ
K XVIII A 768-827
TLG 0530 005
[Ps]

▶ ex commentariis de FASCIIS libellus
ἐκ τῶν Γαληνοῦ ὑπομνημάτων περὶ ’ΕΠΙΔΕΣΜΩΝ βιβλίον
[K XVIII A 828-838]
TLG 0720 001
apud Oribasium XLVIII.19
CMG VI 2, 1. Leipzig and Berlin 1931, 269-273, ed. J. Raeder.
[Ex]
An excerpt of Galen's *in HIPPOCRATIS de OFFICINA medici commentarii III* (TLG 0057 101).

▶ de agnoscendis FEBRIBUS et pulsibus et urinis
[Ps] [L]
Sch. LX; L. 34

▶ de differentiis FEBRIUM libri II
[de FEBRIUM differentiis]
περὶ διαφορᾶς ΠΥΡΕΤΩΝ
K VII 273-405
TLG 0057 045

▶ ad Gaurum quomodo animetur FETUS
περὶ τοῦ πῶς ἐμψυχοῦται τὰ ῞ΕΜΒΡΥΑ
TLG 0530 006
K. Kalbfleisch, *Abh. Akad. Wiss.* Phil-hist. Kl., Berlin, 1895
[Ps]

▶ de FETUUM formatione
περὶ ΚΥΟΥΜΕΝΩΝ διαπλάσεως
K IV 652-702
TLG 0057 022

▶ de GYNAECEIS
[de passionibus MULIERUM]
[Ps] [L]
Ack. CLXVIII.130; D.50

▶ de bono HABITU
[de bono corporis HABITU]
περὶ ΕΥΕΞΙΑΣ
[K IV 750-756]
TLG 0057 025
G. Helmreich, *De optima corporis nostri constitutione. De bono habitu.* GP Hof 1901, pp. 16-20.

▶ in HIPPOCRATIS de AERE aquis locis librum commentarii
[Ps] [L]
Ack. CLXXVII.3; Sch. LVI

▶ in HIPPOCRATIS librum de ALIMENTO commentarii IV
εἰς τὸ ʿΙΠΠΟΚΡΑΤΟΥΣ περὶ ΤΡΟΦΗΣ
K XV 224-417
[Ps] [R]

▶ in HIPPOCRATIS APHORISMOS VII commentarii VII
εἰς ʿΙΠΠΟΚΡΑΤΟΥΣ ʾΑΦΟΡΙΣΜΟΥΣ
K XVII B 345-887, XVIII A 1-195
TLG 0057 092

▶ in HIPPOCRATIS de ARTICULIS liber et Galeni in eum commentarii IV
εἰς τὸ ʿΙΠΠΟΚΡΑΤΟΥΣ περὶ ῎ΑΡΘΡΩΝ βιβλίων καὶ Γαληνοῦ εἰς αὐτὸ ὑπομνήματα Δ΄.
K XVIII A 300-345, [346-422], 423-767
TLG 0057 095
A portion of de ARTICULIS is entered under a separate title and number: *de HUMERO iis modis prolapso quos* HIPPOCRATES *non vidit*

▶ de COMATE secundum HIPPOCRATEM
[de COMATE apud HIPPOCRATEM]
περὶ τοῦ παρ᾽ ʿΙΠΠΟΚΡΑΤΕΙ ΚΩΜΑΤΟΣ
[K VII 643-665]
TLG 0057 052
CMG V 9, 2. Leipzig and Berlin 1915, 179-187, 191-194, ed. J. Mewaldt.

▶ in HIPPOCRATIS de DIAETA acutorum librum commentarii IV
[in HIPPOCRATIS librum de acutorum VICTU commentarii IV]
εἰς τὸ ʿΙΠΠΟΚΡΑΤΟΥΣ περὶ ΔΙΑΙΤΗΣ ὀξέων νοσημάτων καὶ Γαληνοῦ ὑπόμνημα Α΄ Β΄ Γ΄ Δ΄
[K XV 418-919]
TLG 0057 087
CMG V 9, 1. Leipzig and Berlin 1914, 117-366, ed. G. Helmreich.

▶ de ELEMENTIS secundum HIPPOCRATEM libri II
[de ELEMENTIS ex HIPPOCRATE libri II]
περὶ τῶν καθ' ἹΠΠΟΚΡΑΤΗΝ ΣΤΟΙΧΕΙΩΝ
[K I 413-508]
TLG 0057 008
Helmreich, Georg, *Galeni de elementis ex Hippocrate libri II.* Erlangen 1878.

▶ in HIPPOCRATIS EPIDEMIARUM libros:

1. in HIPPOCRATIS EPIDEMIARUM librum I commentarii III
ἹΠΠΟΚΡΑΤΟΥΣ ἘΠΙΔΗΜΙΩΝ Α΄ καὶ Γαληνοῦ εἰς αὐτὸ ὑπόμνημα Α΄ Β΄ Γ΄
[K XVII A 1-302]
TLG 0057 089
CMG V 10, 1. Leipzig and Berlin 1934, 1-151, ed. E. Wenkebach. Greek text pp. 6-151 (pp. 3-5 based upon Arabic text).
2. in HIPPOCRATIS EPIDEMIARUM librum II commentarii V
ἹΠΠΟΚΡΑΤΟΥΣ ἘΠΙΔΗΜΙΩΝ Β΄ καὶ Γαληνοῦ εἰς αὐτὸ ὑπόμνημα Α΄ Β΄ Γ΄ Δ΄ Ε΄
K XVII A 303-479
[R]
Cf. quomodo morbum SIMULANTES sint deprehendendi, a fragment of *in* HIPPOCRATIS EPIDEMIARUM librum II.
3. in HIPPOCRATIS EPIDEMIARUM librum III commentarii III
ἹΠΠΟΚΡΑΤΟΥΣ ἘΠΙΔΗΜΙΩΝ Γ΄ καὶ Γαληνοῦ εἰς αὐτὸ ὑπόμνημα Α΄ Β΄ Γ΄
[K XVII A 480-792]
TLG 0057 090
CMG V 10, 2, 1. Leipzig and Berlin 1936, 1-187, ed. E. Wenkebach.
4. in HIPPOCRATIS EPIDEMIARUM librum VI commentarii VI
ἹΠΠΟΚΡΑΤΟΥΣ ἘΠΙΔΗΜΙΩΝ ΣΤ΄ καὶ Γαληνοῦ εἰς αὐτὸ ὑπόμνημα Α΄ Β΄ Γ΄ Δ΄ Ε΄ ΣΤ΄
[K XVII A 793-1009 XVII B 1-344]
TLG 0057 091
CMG V 10, 2, 2. Berlin 1956, 1-351. ed, E. Wenkebach and F. Pfaff.
N.B.: Commentarii VI 6, 2 *ad fin.* of the CMG edition is based extensively upon Arabic text.
5. in HIPPOCRATIS EPIDEMIARUM libros commentaria: *INDICES nominum et verborum Graecorum.*
CMG V 10, 2, 3. Berlin 1955, ed. E. Wenkebach and K. Schubring. *The indices have not been entered by the TLG.*

▶ in HIPPOCRATIS librum de FRACTURIS commentarii III
[commentarii III in HIPPOCRATIS de FRACTURIS]
εἰς τὸ ῾ΙΠΠΟΚΡΑΤΟΥΣ περὶ ᾽ΑΓΜΩΝ
K XVIII B 318-628
TLG 0057 100

▶ in HIPPOCRATIS in HUMORIBUS librum commentaria III
εἰς τὸ περὶ ΧΥΜΩΝ ῾ΙΠΠΟΚΡΑΤΟΥΣ
K XVI 1-488
[R]

▶ de HUMERO iis modis prolapso quos HIPPOCRATES non vidit
περὶ τῶν οὐχ ἑωραμένων ῾ΙΠΠΟΚΡΑΤΕΙ ᾽ΕΚΠΤΩΣΕΩΝ
K XVIII A 346-422
TLG 0057 096
cf. in HIPPOCRATIS de ARTICULIS liber et Galeni in eum commentarii IV

▶ adversus ea quae a JULIANO in HIPPOCRATIS APHORISMOS enuntiata sunt
[contra ea quae a JULIANO in HIPPOCRATIS APHORISMOS dicta sunt]
πρὸς τὰ ἀντειρημένα τοῖς ῾ΙΠΠΟΚΡΑΤΟΥΣ ᾽ΑΦΟΡΙΣΜΟΙΣ ὑπὸ ᾽ΙΟΥΛΙΑΝΟΥ
[K XVIII A 246-299]
TLG 0057 094
CMG V, 10, 3, Berlin, 1951, 33-70, ed. E. Wenkebach.

▶ in HIPPOCRATIS LEGEM commentarius
[in HIPPOCRATIS IUSIURANDUM commentarius]
[A]
Sch. LX; L. 34

▶ LINGUARUM seu dictionum exoletarum HIPPOCRATIS explicatio
[VOCUM obsoletarum HIPPOCRATIS explanatio]
τῶν ῾ΙΠΠΟΚΡΑΤΟΥΣ ΓΛΩΣΣΩΝ ἐξήγησις
K XIX 62-157
TLG 0057 106

▶ in HIPPOCRATIS de NATURA hominis commentaria II

[HIPPOCRATIS de NATURA hominis liber primus et Galeni in eum commentaria]

[in HIPPOCRATIS de natura humana]

εἰς τὸ ʿΙΠΠΟΚΡΑΤΟΥΣ περὶ ΦΥΣΙΟΣ ἀνθρώπου

[Γαληνοῦ εἰς τὸ ʿΙΠΠΟΚΡΑΤΟΥΣ περὶ ΦΥΣΙΟΣ ἀνθρώπου βιβλίον ὑπόμνημα Α΄ Β΄]

[K XV 1-173]

TLG 0057 085

CMG V 9, 1. Leipzig and Berlin 1914, 1-88, ed. J. Mewaldt.

N.B.: Galeni in HIPPOCRATIS de NATURA hominis commentarius tertius = in HIPPOCRATIS vel Polybi opus de salubri VICTUS ratione privatorum commentarius.

▶ in HIPPOCRATIS de OFFICINA medici commentarii III

[in HIPPOCRATIS librum de OFFICINA medici commentarius]

[in HIPPOCRATIS de medica OFFICINA]

εἰς τὸ ʿΙΠΠΟΚΡΑΤΟΥΣ κατ᾽ ʾΙΗΤΡΕΙΟΝ

K XVIII B 629-925

TLG 0057 101

Cf. ex commentariis de FASCIIS libellus

▶ de PLACITIS HIPPOCRATIS et PLATONIS libri IX

[de HIPPOCRATIS et PLATONIS DECRETIS libri IX]

περὶ τῶν ʿΙΠΠΟΚΡΑΤΟΥΣ καὶ ΠΛΑΤΩΝΟΣ ΔΟΓΜΑΤΩΝ

[περὶ τῶν καθ᾽ ʿΙΠΠΟΚΡΑΤΗΝ καὶ ΠΛΑΤΩΝΑ ΔΟΓΜΑΤΩΝ]

[K V 181-805]

TLG 0057 032

CMG V 4, 1, 2. *On the Doctrines of Hippocrates and Plato. First Part: Books I-V,* Berlin 1978, ed. P. De Lacy.

N.B.: TLG has entered typescript of CMG text ed. P. De Lacy for books VI-IX.

▶ in HIPPOCRATIS PROGNOSTICUM commentaria III

[commentaria III in HIPPOCRATIS PROGNOSTICA]

εἰς τὸ ʿΙΠΠΟΚΡΑΤΟΥΣ ΠΡΟΓΝΩΣΤΙΚΟΝ

[K XVIII B 1-317]

TLG 0057 099

CMG V 9, 2. Leipzig and Berlin 1915, 195-378, ed. J. Heeg.

▶ in HIPPOCRATIS PRORRHETICUM I commentaria III
[in HIPPOCRATIS PRAEDICTIONUM librum primum commentarii III]
εἰς τὸ ῾ΙΠΠΟΚΡΑΤΟΥΣ ΠΡΟΡΡΗΤΙΚΟΝ Α΄
[K XVI 489-840]
TLG 0057 088
CMG V 9, 2. Leipzig and Berlin, 1915, 1-178, ed. H. Diels.

▶ in HIPPOCRATIS de SEPTIMANIS commentaria
περὶ ῾ΕΒΔΟΜΑΔΟΣ
CMG XI 2, 1, 6. Leipzig and Berlin 1914, ed. G. Bergsträsser.
[Ps] [A]

▶ quaesita in HIPPOCRATEM de URINIS
[Ps] [L]
Ack. CLXVI.120; L. 34

▶ in HIPPOCRATIS vel Polybi opus de salubri VICTUS ratione privatorum commentarius
εἰς τὸ περὶ ΔΙΑΙΤΗΣ ὑγιεινῆς τῶν ἰδιωτῶν ῾ΙΠΠΟΚΡΑΤΟΥΣ ἢ Πολύβου ὑπόμνημα
[K XV 174-223]
TLG 0057 086
CMG V 9, 1. Leipzig and Berlin 1914, 89-113, ed. J. Mewaldt.
N.B.: in HIPPOCRATIS vel Polybi opus de de salubri VICTUS ratione = in HIPPOCRATIS de NATURA hominis commentarius tertius.
(TLG 0057 085 = in HIPPOCRATIS de NATURA hominis commentaria I & II.)

▶ de VICTUS ratione in morbis acutis ex HIPPOCRATIS sententia
[de DIAETA HIPPOCRATIS in morbis acutis]
[de DIAETA in morbis acutis secundum HIPPOCRATEM]
περὶ τῆς κατὰ τὸν ῾ΙΠΠΟΚΡΑΤΗ ΔΙΑΙΤΗΣ ἐπὶ τῶν ὀξέων νοσημάτων
[K XIX 182-211]
TLG 0530 037
CMG V 9, 1. Leipzig and Berlin 1914, 369-392, ed. J. Westenberger.
[Ps]

▶ de HIRUNDINIBUS, revulsione, cucurbitula, incisione et scarificatione
περὶ ΒΔΕΛΛΩΝ, ἀντισπάσεως, σικύας καὶ ἐγχαράξεως καὶ κατασχασμοῦ
K XI 317-322
TLG 0057 071

▶ de HUMORIBUS
περὶ ΧΥΜΩΝ
K XIX 485-496
TLG 0530 009
[Ps]

▶ Thrasybulus sive utrum medicinae sit an gymnastices HYGIEINE
[utrum medicinae sit an gymnastices HYGIEINE ad Thrasybulum liber]
Θρασύβουλος, πότερον ἰατρικῆς ἢ γυμναστικῆς ἐστὶ τὸ ʻΥΓΙΕΙΝΟΝ
[K V 806-898]
TLG 0057 033
SM III 33-100, ed. G. Helmreich.

▶ de cura ICTERI
[Ps] [L]
Ack. CLXVII.126; D. 35

▶ de INCANTATIONE adjuratione, et suspensione
[Ps] [L]
Ack. CLXIX.134; D. 56

▶ historia INCISIONIS
[Ps] [L]
Sch. LXI; L. 35

▶ de dignotione ex INSOMNIIS
περὶ τῆς ἐξ ʼΕΝΥΠΝΙΩΝ διαγνώσεως
K VI 832-835
TLG 0057 040

▶ INSTITUTIO logica
ʼΕΙΣΑΓΩΓΗ διαλεκτική
[ΕΙΣΑΓΩΓΗ λογική]
TLG 0057 081
K. Kalbfleisch, *Galeni institutio logica.* BT, Leipzig 1896.

▶ de inaequali INTEMPERIE
περὶ ἀνωμάλου ΔΥΣΚΡΑΣΙΑΣ
K VII 733-752
TLG 0057 055

▶ INTRODUCTIO sive medicus
ΕΙΣΑΓΩΓΗ ἢ ἰατρός
K XIV 674-797
TLG 0530 012
[Ps]

▶ INTRODUCTORIUS liber varias morborum curas complectens
[Ps] [L]
Ack. CLXVII.125

▶ de cura LAPIDIS
[de curatione LAPIDIS]
[Ps] [L]
Ack. CLXVIII.131; L. 35

▶ de LIBRIS propriis
περὶ τῶν ἰδίων ΒΙΒΛΙΩΝ
[K XIX 8-48]
TLG 0057 104
SM II 91-124, ed. Iwan Müller

▶ de ordine LIBRORUM suorum ad Eugenianum
περὶ τῆς τάξεως τῶν ἰδίων ΒΙΒΛΙΩΝ πρὸς Εὐγενιανόν
[K XIX 49-61]
TLG 0057 105
SM II 80-90, ed. Iwan Müller

▶ de LOCIS affectis libri VI
περὶ τῶν πεπονθότων ΤΟΠΩΝ
K VIII 1-452
TLG 0057 057

▶ adversus LYCUM libellus
πρὸς ΛΥΚΟΝ
[K XVIII A 196-245]
TLG 0057 093
CMG V 10, 3. Berlin 1951, 3-29, ed. E. Wenkebach

▶ de MARCORE
[de MARASMO]
περὶ ΜΑΡΑΣΜΟΥ
K VII 666-704
TLG 0057 053

▶ de Glauconem de MEDENDI methodo libri II
[ad Glauconem de methodo MEDENDI]
[de ratione MEDENDI ad Glauconem]
τῶν πρὸς Γλαύκωνα ΘΕΡΑΠΕΥΤΙΚΩΝ βιβλία
[πρὸς Γλαύκωνα ΘΕΡΑΠΕΥΤΙΚΑ]
K XI 1-146
TLG 0057 067

▶ de methodo MEDENDI libri XIV
[methodi MEDENDI libri XIV]
[ΘΕΡΑΠΕΥΤΙΚΗΣ μεθόδου βιβλία]
K X 1-1021
TLG 0057 066

▶ de compositione MEDICAMENTORUM per genera libri VII
περὶ συνθέσεως ΦΑΡΜΑΚΩΝ τῶν κατὰ γένη
K XIII 362-1058
TLG 0057 077

▶ de compositione MEDICAMENTORUM secundum locos libri X
περὶ συνθέσεως ΦΑΡΜΑΚΩΝ τῶν κατὰ τόπους
K XII 378-1007; XIII 1-361
TLG 0057 076

▶ de purgantium MEDICAMENTORUM facultate
περὶ τῆς τῶν καθαιρόντων ΦΑΡΜΑΚΩΝ δυνάμεως
[K XI 323-342]
TLG 0057 072
Ehlert, J., *Galeni de purgantium medicamentorum facultate,* Diss. Göttingen 1959.

▶ de simplicium MEDICAMENTORUM temperamentis et facultatibus libri XI
περὶ κράσεως καὶ δυνάμεως τῶν ἁπλῶν ΦΑΡΜΑΚΩΝ
K XI 379-892; XII 1-377
TLG 0057 075

▶ de simplicibus MEDICAMINIBUS ad Paternianum
[Ps] [L]
Ack. CLXXI.139; D. 107

▶ liber de MEDICINIS expertis
[Ps] [L]
Ack. CLXIX.133; Sch. LXI

▶ quod optimus MEDICUS sit quoque philosophus
ὅτι ὁ ἄριστος ΙΑΤΡΟΣ καὶ φιλόσοφος
[K I 53-63]
TLG 0057 003
Wenkebach, E., *Quellen und Studien zur Geschichte der Naturwissenschaft und Medizin,* 3-4 (1932-33) 155-175.

▶ de MELANCHOLIA ex Galeno, Rufo, Posidonio et Marcello Aetii liber
περὶ ΜΕΛΑΓΧΟΛΙΑΣ ἐκ τῶν Γαληνοῦ καὶ Ῥούφου καὶ Ποσειδωνίου καὶ Μαρκέλλου Σικαμίου τοῦ Ἀετίου βιβλίων
[K XIX 699-720]
TLG 0057 121
CMG VIII 2, 143-146, ed. A. Olivieri, Aetius Amidenus: *Liber medicinalis* VI, 9-10.
N.B.: Only the text of Galen entered by the TLG.

▶ de compage MEMBRORUM
[de compagine MEMRORUM]
[de compagine MEMBRORUM sive de natura humana]
[Ps] [L]
Ack. CLXI.105; Sch. LXI

▶ de totius MORBI temporibus
περὶ τῶν ὅλου τοῦ ΝΟΣΗΜΑΤΟΣ καιρῶν
[K VII 440-462]
TLG 0057 047
Wille, I., *Die Schrift Galens* Περὶ τῶν ἐν ταῖς νόσοις καιρῶν *und ihre Ueberlieferung,* Diss. Kiel, 1960: Part II pp. 70-114. Cf. De MORBORUM temporibus.

▶ de causis MORBORUM liber
[de MORBORUM causis]
περὶ τῶν ἐν τοῖς ΝΟΣΗΜΑΣΙΝ αἰτίων
K VII 1-41
TLG 0057 042

▶ de MORBORUM differentiis
[de differentiis MORBORUM]
περὶ διαφορᾶς ΝΟΣΗΜΑΤΩΝ
K VI 836-880
TLG 0057 041

▶ de MORBORUM temporibus
[de TEMPORIBUS morborum]
περὶ τῶν ἐν ταῖς ΝΟΣΟΙΣ καιρῶν
[K VII 406-439]
TLG 0057 046
Wille, I., *Die Schrift Galens* Περὶ τῶν ἐν ταῖς νόσοις καιρῶν *und ihre Ueberlieferung*, Diss. Kiel, 1960: Part II, pp. 1-70.
Cf. de totius MORBI temporibus.

▶ de MORIBUS
[MORALIA]
[ETHICA]
περὶ ’ΗΘΩΝ
Ack. CC; Sch. LVII; L. 27

▶ de MORSU qui in aegritudine percipitur
[Ps] [L]
Ack. CLXXIII.7

▶ de MORTE subitanea
[de MORBO icterico]
[Ps] [L]
Sch. LXI; L. 35

▶ de MOTIBUS manifestis et obscuris
[Ps] [L]
Ack. CLXII.108; D. 67

▶ de MOTU thoracis et pulmonis
περὶ θώρακος καὶ πνεύματος ΚΙΝΗΣΕΩΣ
[L]
Ack. CLI.90; L. 35; D. 69

▶ de MUSCULORUM dissectione ad tirones
περὶ ΜΥΩΝ ἀνατομῆς
K XVIII B 926-1026
TLG 0057 102

▶ de motu MUSCULORUM libri II
περὶ ΜΥΩΝ κινήσεως
K IV 367-464
TLG 0057 018

▶ de NATURA et ordine cuiuslibet corporis
[Ps] [L]
Ack. CLXI.106; Sch. LXI

▶ de NERVORUM dissectione
περὶ ΝΕΥΡΩΝ ἀνατομῆς
K II 831-856
TLG 0057 014

▶ de NOMINIBUS medicis
περὶ ἰατρικῶν ᾽ΟΝΟΜΑΤΩΝ
[A]
Ack. CXCIV; Sch. LVIII; L. 28

▶ de OCULIS
[de morbis OCULORUM et eorum curis]
[Ps] [L]
Ack. CLXVIII.128; Sch. LXI; L. 35; D. 74

▶ de instrumento ODORATUS
περὶ ᾽ΟΣΦΡΗΣΕΩΣ ὀργάνου
[K II 857-886]
TLG 0057 015
CMG Suppl. V Berlin 1964, ed. J. Kollesch
Part I: Excerpta ex libris ANATOMICIS Marini, pp. 30-33.
Part II: de instrumento ODORATUS, pp. 34-64.

▶ OECONOMICA
[Ps] [L]
Sch. LXI; L. 35
Latin text from Arabic version.

▶ de OSSIBUS ad tirones
περὶ ᾽ΟΣΤΩΝ τοῖς εἰσαγομένοις
K II 732-778
TLG 0057 012
N.B.: For technical reasons, the TLG has entered the Kühn text rather than that of a later edition.

▶ de PARTIBUS artis medicativae
[de PARTIBUS artis medicae]
περὶ τῶν τῆς ἰατρικῆς ΜΕΡΩΝ
[A] [L]
Ack. CLX. 103; Sch. LVIII; L. 28; D. 81

▶ de usu PARTIUM corporis humani libri XVII
περὶ χρείας τῶν ἐν ἀνθρώπου σώματι ΜΟΡΙΩΝ
[K III 1-939, IV 1-366]
TLG 0057 017
BT, Leipzig 1907, 1909, ed. G. Helmreich. Reprint: Amsterdam 1968. Vol. I: I-VIII; Vol. II: IX-XVII.

▶ de septimestri PARTU
περὶ ἑπταμήνων ΒΡΕΦΩΝ
TLG 0057 080
H. Schöne, "Galens Schrift über die Siebenmonatskinder" *Quellen und Studien zur Geschichte der Naturwissenschaft und Medizin* 3 (1933) 127-130.

▶ de PESTE
[Ps] [L]
Ack. CLXXII.144

▶ de historia PHILOSOPHA
[de PHILOSOPHICA historia]
περὶ ΦΙΛΟΣΟΦΟΣ ἱστορίας
[ΦΙΛΟΣΟΦΟΣ ἱστορία]
[K XIX 222-345]
TLG 0530 042
H. Diels, *Doxographi Graeci,* Berlin, 1879 (reprint De Gruyter, 1965) 567-648.
[Ps]

▶ de partibus PHILOSOPHIAE
περὶ εἰδῶν ΦΙΛΟΣΟΦΙΑΣ
TLG 0530 020
E. Wellman, *Galeni qui fertur de partibus philosophiae libellus,* Berlin, 1882. Entered via R. Kotrc, CMG text, not yet in print.
[Ps]

▶ de PICA, vitioso appetitu, ex Galeno per Aetium
[Ps] [L]
Ack. CLXVIII.129

▶ de parvae PILAE exercitio
περὶ τοῦ διὰ τῆς σμικρᾶς ΣΦΑΙΡΑΣ γυμνασίου
[K V 899-910]
TLG 0057 034
AGM 31 (1938) 258-272, ed. E. Wenkebach

▶ de propriis PLACITIS:
περὶ τῶν ἑαυτῷ ΔΟΚΟΥΝΤΩΝ
1. de substantia FACULTATUM naturalium fragmentum
περὶ οὐσίας τῶν φυσικῶν ΔΥΝΑΜΕΩΝ
K IV 757-766
TLG 0057 084
2. "Περὶ τῶν ἑαυτῷ δοκούντων fragmenta inedita."
TLG 0057 026
G. Helmreich, *Philologus* 52 (1894) 431-434.

▶ de PLANTIS
[Ps] [L]
Ack. CLXXI.140; Sch. LXI-LXII; L. 36; D.83

▶ in PLATONIS REM PUBLICAM
[A]
Sch. LVIII

▶ compendium TIMAEI PLATONIS
[A]
Sch. LIX; L. 20

▶ in PLATONIS TIMAEUM commentarius
[fragmentum ex quattuor commentariis de iis quae medice dicta sunt in PLATONIS TIMAEO]
περὶ τῶν ἐν τῷ ΠΛΑΤΩΝΟΣ Τιμαίῳ ἰατρικῶς εἰρημένων ὑπομνήματα τέτταρα
TLG 0057 005
CMG, Suppl. I. Leipzig & Berlin 1934, 1-35, ed. H.O. Schroeder.
N.B.: Fragments of the third book only are preserved in Greek (CMG pp. 9-26).

▶ de PLENITUDINE
περὶ ΠΛΗΘΟΥΣ
K VII 513-583
TLG 0057 050

▶ de PONDERIBUS et mensuris
περὶ ΜΕΤΡΩΝ καὶ σταθμῶν
K XIX 748-781
TLG 0530 022
F. Hultsch, *Metrologicorum Scriptorum Reliquiae I,* Leipzig, 1864 (reprint 1971) 218-244
[Ps]

▶ de PRAEGNOTIONE ad Epigenem
[de PRAECOGNITIONE ad Epigenem]
[de PRAENOTIONE ad Posthumum]
περὶ τοῦ ΠΡΟΓΙΓΝΩΣΚΕΙΝ πρὸς Ἐπιγένην
K XIV 599-673
TLG 0057 083

▶ de PRAENOTIONE
[de PRAESAGITURA]
περὶ ΠΡΟΓΝΩΣΕΩΣ
cf. de CONSTITUTIONE artis medicae ad Patrophilum

▶ PRAESAGITIO omnino vera expertaque
[PRAESAGIUM experientia confirmatum]
ΠΡΟΓΝΩΣΙΣ πεπειραμένη καὶ παναλήθης
K XIX 512-518
TLG 0530 023
[Ps]

▶ de causis PROCATARCTICIS
περὶ τῶν ΠΡΟΚΑΤΑΡΚΤΙΚΩΝ αἰτίων
[L]
Ack. CX.45; Sch. LV; L. 20
N.B.: The Greek text associated with this treatise is a late reconstruction.

▶ PROGNOSTICA de decubitu ex mathematica scientia
[PROGNOSTICA de decubitu infirmorum]
περὶ ΚΑΤΑΚΛΙΣΕΩΣ προγνωστικὰ ἐκ τῆς μαθηματικῆς ἐπιστήμης
[περὶ ΚΑΤΑΚΛΙΣΕΩΣ νοσούντων προγνωστικά]
K XIX 529-573
TLG 0530 024
[Ps]

▶ de PTISANA
περὶ ΠΤΙΣΑΝΗΣ
[K VI 816-831]
TLG 0057 039
CMG V 4, 2. Leipzig and Berlin 1923, 455-463, ed. O. Hartlich.

▶ de PULSIBUS ad Antonium disciplinae studiosum ac philosophum
περὶ ΣΦΥΓΜΩΝ πρὸς Ἀντώνιον φιλομαθῆ καὶ φιλόσοφον
K XIX 629-642
TLG 0530 026
[Ps]

▶ compendium de PULSIBUS
[compendium PULSUUM Galeno adscriptum]
[Ps] [L]
Ack. CLXVI.122; Sch. LXII; L. 36; D. 282

▶ de dignoscendis PULSIBUS libri IV
περὶ διαγνώσεως ΣΦΥΓΜΩΝ
K VIII 766-961
TLG 0057 060

▶ de praesagitione ex PULSIBUS libri IV
[de praesagitione ex PULSU]
περὶ προγνώσεως ΣΦΥΓΜΩΝ
K IX 205-430
TLG 0057 062

▶ synopsis librorum suorum de PULSIBUS
σύνοψις περὶ ΣΦΥΓΜΩΝ ἰδίας πραγματείας
K IX 431-533
TLG 0057 063
K IX 534-549 Latin only.

▶ de PULSIBUS ad tirones
περὶ ΣΦΥΓΜΩΝ τοῖς εἰσαγομένοις
K VIII 453-492
TLG 0057 058

▶ de PULSIBUS et urinis
[Ps] [L]
Sch. LXII; L. 36

▶ de causis PULSUUM libri IV
περὶ τῶν ἐν τοῖς ΣΦΥΓΜΟΙΣ αἰτίων
K IX 1-204
TLG 0057 061

▶ de differentia PULSUUM libri IV
[de PULSUUM differentiis libri IV]
περὶ διαφορᾶς ΣΦΥΓΜΩΝ
K VIII 493-765
TLG 0057 059

▶ de usu PULSUUM
περὶ χρείας ΣΦΥΓΜΩΝ
K V 149-180
TLG 0057 031

▶ quos, quibus catharticis medicamentis et quando PURGARE oporteat
τίνας δεῖ ΄ΕΚΚΑΘΑΙΡΕΙΝ καὶ ποίοις καθαρτηρίοις καὶ πότε
[K XI 343-365]
TLG 0057 073
CMG VI 1, 1. Leipzig & Berlin 1928, 221-227, ed. J. Raeder apud Oribasium.

▶ quod QUALITATES incorporeae sint
ὅτι αἱ ΠΟΙΟΤΗΤΕΣ ἀσώματοι
[K XIX 463-484]
TLG 0057 111
J. Westenberger, *Galeni de qualitatibus incorporeis libellus.* Diss. Marburg 1906.

▶ de REMEDIIS parabilibus libri III
[de REMEDIIS parabilibus libri II]
[de REMEDIIS paratu facilibus liber III]
περὶ ΄ΕΥΠΟΡΙΣΤΩΝ
K XIV 311-581
TLG 0530 029

▶ de affectuum RENIBUS insidentium dignotione et curatione
[de RENUM affectus dignotione]
περὶ τῆς τῶν ἐν ΝΕΦΡΟΙΣ παθῶν διαγνώσεως καὶ θεραπείας
K XIX 643-698
TLG 0530 045

▶ de causis RESPIRATIONIS
περὶ τῶν τῆς ᾽ΑΝΑΠΝΟΗΣ αἰτίων
K IV 465-469
TLG 0057 114

▶ de difficultate RESPIRATIONIS libri III
περὶ ΔΥΣΠΝΟΙΑΣ
K VII 754-960
TLG 0057 056

▶ de RESPIRATIONIS usu
[de iuvamento ANHELITUS]
[Ps] [L]
Ack. CL.86; D. 124

▶ de utilitate RESPIRATIONIS liber
[de RESPIRATIONIS usu]
περὶ χρείας ᾽ΑΝΑΠΝΟΗΣ
[K IV 470-511]
TLG 0057 020
R. Noll, *Galeni* Περὶ χρείας ἀναπνοῆς *libellus.* Diss. Marburg 1915.

▶ de SANITATE tuenda libri VI
῾ΥΓΙΕΙΝΩΝ λόγοι
[K VI 1-452]
TLG 0057 036
CMG V 4, 2. Leipzig and Berlin 1923, 3-198, ed. K. Koch.

▶ liber SECRETORUM ad Monetum
[Ps] [L]
Ack. CLXVIII.132; D. 135

▶ de optima SECTA ad Thrasybulum
περὶ τῆς ἀρίστης ῾ΑΙΡΕΣΕΩΣ πρὸς Θρασύβουλον
K I 106-223
TLG 0530 043

▶ de SECTIS ad eos qui introducuntur
περὶ ῾ΑΙΡΕΣΕΩΝ τοῖς εἰσαγομένοις
[K I 64-105]
TLG 0057 004
SM III 1-32, ed. G. Helmreich.

▶ de SEMINE libri II
περὶ ΣΠΕΡΜΑΤΟΣ
K IV 512-651
TLG 0057 021

▶ quomodo morbum SIMULANTES sint deprehendendi
πῶς δεῖ ἐξελέγχειν τοὺς ΠΡΟΣΠΟΙΟΥΜΕΝΟΥΣ νοσεῖν
[K XIX 1-7]
TLG 0057 115
CMG V 2, 4. Berlin 1960, 113-116, ed. K. Deichgräber and F. Kudlien.
N.B.: This work is a genuine fragment of in HIPPOCRATIS EPIDEMIARUM librum II.

▶ de SOPHISMATIS seu captionibus penes dictionem
[de CAPTIONIBUS penes dictionem]
περὶ τῶν παρὰ τὴν λέξιν ΣΟΦΙΣΜΑΤΩΝ
[K XIV 582-598]
TLG 0057 082
K. Gabler, *Galeni libellus de captionibus quae per dictionem fiunt ad fidem unius qui superest codicis editus.* Diss. Rostock 1903.

▶ de SPERMATE
[Ps] [L]
Ack. XCIII.28; D. 109
Cf. *de SEMINE libri II*

▶ de SUBFIGURATIONE empirica
῾ΥΠΟΤΥΠΩΣΕΙΣ ἐμπειρικαί
[L]
Ack. CXLIX.84

▶ de SUCCEDANEIS
περὶ ᾽ΑΝΤΕΜΒΑΛΛΟΜΕΝΩΝ
K XIX 721-747
TLG 0530 031
[Ps]

▶ de rebus boni malique SUCI
[de probis pravisque ALIMENTORUM sucis]
[de bonis malisque SUCIS]
περὶ εὐχυμίας καὶ κακοχυμίας ΤΡΟΦΩΝ
[K VI 749-815]
TLG 0057 038
CMG V 4, 2. Leipzig and Berlin 1923, 389-429, ed. G. Helmreich.

▶ de SYMPTOMATUM causis libri III
περὶ αἰτίων ΣΥΜΠΤΩΜΑΤΩΝ
K VII 85-272
TLG 0057 044

▶ de SYMPTOMATUM differentiis
περὶ τῆς τῶν ΣΥΜΠΤΩΜΑΤΩΝ διαφορᾶς
K VII 42-84
TLG 0057 043

▶ de TEMPERAMENTIS libri III
περὶ ΚΡΑΣΕΩΝ
[K I 509-694]
TLG 0057 009
BT. Leipzig 1904 (reprint ed. 1969), ed. G. Helmreich

▶ de THERIACA ad Pamphilianum
περὶ ΘΗΡΙΑΚΗΣ πρὸς Παμφιλιανόν
K XIV 295-310
TLG 0530 032
[Ps]

▶ de THERIACA ad Pisonem
πρὸς Πίσωνα περὶ ΘΗΡΙΑΚΗΣ
K XIV 210-294
TLG 0057 079

▶ de TREMORE, palpitatione, convulsione et rigore
[de PALPITATIONE, tremore, rigore et convulsione]
περὶ ΤΡΟΜΟΥ καὶ παλμοῦ καὶ σπασμοῦ καὶ ῥίγους
K VII 584-642
TLG 0057 051

▶ de TUMORIBUS praeter naturam
περὶ τῶν παρὰ φύσιν ’ΟΓΚΩΝ
[K VII 705-732]
TLG 0057 054
J. Reedy, *De Tumoribus Praeter Naturam.* Diss. Ann Arbor 1968.

▶ adversus eos qui de TYPIS scripserunt
[ad eos qui de TYPIS scripserunt]
πρὸς τοὺς περὶ ΤΥΠΩΝ γράψαντας
K VII 475-512
TLG 0057 049

▶ de TYPIS
περὶ ΤΥΠΩΝ
K VII 463-474
TLG 0057 048

▶ de URINIS
περὶ ’ΟΥΡΩΝ
K XIX 574-601
TLG 0530 033
[Ps]

▶ de URINIS compendium
περὶ ’ΟΥΡΩΝ ἐν συντόμῳ
K XIX 602-608
TLG 0530 034
[Ps]

▶ de URINIS ex Hippocrate Galeno aliisque quibusdam
περὶ ’ΟΥΡΩΝ ἐκ τῶν Ἱπποκράτους καὶ Γαληνοῦ καὶ ἄλλων τινῶν
K XIX 609-628
TLG 0530 035
[Ps]

▶ de UTERI dissectione
περὶ ΜΗΤΡΑΣ ἀνατομῆς
[K II 887-908]
TLG 0057 016
CMG V 2, 1. Berlin 1971, ed. D. Nickel

▶ de VENAE SECTIONE
περὶ ΦΛΕΒΟΤΟΜΙΑΣ
K XIX 519-528
TLG 0530 036
[Ps]

▶ de VENAE SECTIONE adversus Erasistrateos Romae degentes
περὶ ΦΛΕΒΟΤΟΜΙΑΣ πρὸς Ἐρασιστρατείους ἐν Ῥώμῃ
K XI 187-249
TLG 0057 069

▶ de VENAE SECTIONE adversus Erasistratum
περὶ ΦΛΕΒΟΤΟΜΙΑΣ πρὸς Ἐρασίστρατον
K XI 147-186
TLG 0057 068

▶ de curandi ratione per VENAE SECTIONEM
περὶ ΦΛΕΒΟΤΟΜΙΑΣ θεραπευτικόν
K XI 250-316
TLG 0057 070

▶ de VENARUM arteriarumque dissectione
περὶ ΦΛΕΒΩΝ καὶ ἀρτηριῶν ἀνατομῆς
K II 779-830
TLG 0057 013

▶ de VENEREIS
περὶ ΑΦΡΟΔΙΣΙΩΝ
[K V 911-914]
TLG 0057 035
CMG VI 1, 1. Leipzig and Berlin, 1928, pp. 187-189, ed. J. Raeder apud Oribasium, *Collectiones medicae* VI 37.

▶ de VICTU attenuante
[de attenuante victus ratione]
περὶ λεπτυνούσης ΔΙΑΙΤΗΣ
TLG 0057 019
CMG V 4, 2. Leipzig and Berlin 1923, 433-451, ed. K. Kalbfleisch.

▶ VOCALIUM instrumentorum dissectio
[de dissectione VOCALIUM instrumentorum]
[L]
Sch. LXII; L. 35

▶ de VOCE
περὶ ΦΩΝΗΣ
Ack. CXCIV; Sch. LIX
[NE]

▶ de VOCE et (h)anhelitu
[Ps] [L]
Ack. CL; Sch. LXII

▶ de caduca VOLUPTATE secundum Epicurum
περὶ τῆς κατ᾽ Ἐπίκουρον ἀμυδροῦ [ἀμαυροῦ] ΗΔΟΝΗΣ βιβλία Β΄
Ack. CCII; Sch. LVI
[NE]

INDEX I: SECONDARY LATIN TITLES

de probis pravisque ALIMENTORUM sucis → de rebus boni malique SUCI

de iuvamento ANHELITU → de RESPIRATIONIS usu

an ANIMAL sit id quod in utero inest → an ANIMAL sit quod est in utero

de ANIMI cuiuslibet peccatorum dignotione et curatione → de cuiuslibet ANIMI peccatorum dignotione atque medela libellus

de ANIMI cuiuslibet peccatorum dignotione et medela → de cuiuslibet ANIMI peccatorum dignotione atque medela libellus

de cognoscendis curandisque ANIMI morbis → de propriorum ANIMI cuiuslibet affectuum dignotione et curatione

ARS parva → ARS medica

an sanguis in ARTERIIS natura contineatur → an in ARTERIIS natura sanguis contineatur

de CAPTIONIBUS penes dictionem → de SOPHISMATIS seu captionibus penes dictionem

de CLYSTERIBUS et de colico dolore → de CLYSTERIBUS et colica

de COLICO dolore → de CLYSTERIBUS et colica

de CONSUETUDINE → de CONSUETUDINIBUS

de causis CONTENTIVIS → de causis CONTINENTIBUS

de facultatibus CORPUS nostrum dispensantibus → de virtutibus nostrum CORPUS dispensantibus

DEFINITIONES medicae ad Theutram scriptae → DEFINITIONES medicae

de partium homoeomerium DIFFERENTIA → de homoeomereis CORPORIBUS

de optimo DOCENDI genere libellus → de optima DOCTRINA

de optima DOCTRINA ad Favorinum → de optima DOCTRINA

sermo adversus EMPIRICOS medicos → sermo contra EMPIRICOS

de puero EPILEPTICO → pro puero EPILEPTICO consilium

ETHICA → de MORIBUS

de substantia FACULTATUM naturalium fragmentum → de propriis PLACITIS

de FEBRIUM differentiis → de differentiis FEBRIUM libri II

de bono corporis HABITU → de bono HABITU

contra ea quae a Juliano in HIPPOCRATIS APHORISMOS dicta sunt → adversus ea quae a JULIANO IN HIPPOCRATIS APHORISMOS enuntiata sunt

de COMATE apud HIPPOCRATEM → de COMATE secundum HIPPOCRATEM

de DIAETA HIPPOCRATIS in morbis acutis → de VICTUS ratione in morbis acutis ex HIPPOCRATIS sententia

de DIAETA in morbis acutis secundum HIPPOCRATEM → de VICTUS ratione in morbis acutis ex HIPPOCRATIS sententia

de ELEMENTIS ex HIPPOCRATE libri II → de ELEMENTIS secundum HIPPOCRATEM libri II

in HIPPOCRATIS EPIDEMIARUM librum I commentarii III → in HIPPOCRATIS EPIDEMIARUM libros

in HIPPOCRATIS EPIDEMIARUM librum II commentarii V → in HIPPOCRATIS EPIDEMIARUM libros

in HIPPOCRATIS EPIDEMIARUM librum III commentarii III → in HIPPOCRATIS EPIDEMIARUM libros

in HIPPOCRATIS EPIDEMIARUM librum VI commentarii VI → in HIPPOCRATIS EPIDEMIARUM libros

commentarii III in HIPPOCRATIS de FRACTURIS → in HIPPOCRATIS librum de FRACTURIS commentarii III

in HIPPOCRATIS IUSIURANDUM commentarius → in HIPPOCRATIS LEGEM commentarius

HIPPOCRATIS de NATURA hominis liber primus et Galeni in eum commentaria → in HIPPOCRATIS de NATURA hominis commentaria II

in HIPPOCRATIS de NATURA humana → in HIPPOCRATIS de NATURA hominis commentaria II

in HIPPOCRATIS librum de OFFICINA medici commentarius → in HIPPOCRATIS de OFFICINA medici commentarii III

in HIPPOCRATIS de medica OFFICINA → in HIPPOCRATIS de OFFICINA medici commentarii III

de HIPPOCRATIS et PLATONIS DECRETIS libri IX → de PLACITIS HIPPOCRATIS et PLATONIS libri IX

in HIPPOCRATIS PRAEDICTIONUM librum primum commentarii III → in HIPPOCRATIS PRORRHETICUM I commentaria III

commentaria III in HIPPOCRATIS PROGNOSTICA → in HIPPOCRATIS PROGNOSTICUM commentaria III

in HIPPOCRATIS librum de acutorum VICTU commentarii IV → in HIPPOCRATIS de DIAETA acutorum librum commentarii IV

VOCUM obsoletarum HIPPOCRATIS explanatio → LINGUARUM seu dictionum exoletarum HIPPOCRATIS explicatio

utrum medicinae sit an gymnastices HYGIEINE ad Thrasybulum liber → Thrasybulus sive utrum medicinae sit an gymnastices HYGIEINE

de curatione LAPIDIS → de cura LAPIDIS

de MARASMO → de MARCORE

ad Glauconem de methodo MEDENDI → ad Glauconem de MEDENDI methodo libri II

methodi MEDENDI libri XIV → de methodo MEDENDI libri XIV

de ratione MEDENDI ad Glauconem → ad Glauconem de MEDENDI methodo libri II

de compagine MEMBRORUM → de compage MEMBRORUM

de compagine MEMBRORUM sive de natura humana → de compage MEMBRORUM

MORALIA → de MORIBUS

de MORBORUM causis → de causis MORBORUM liber

de differentiis MORBORUM → de MORBORUM differentiis

de MORBO icterico → de MORTE subitanea

de passionibus MULIERUM → de GYNAECEIS

de morbis OCULORUM et eorum curis → de OCULIS

de PALPITATIONE, tremore, rigore et convulsione → de TREMORE, palpitatione, convulsione et rigore

de PARTIBUS artis medicae → de PARTIBUS artis medicativae

de PHILOSOPHICA historia → de historia PHILOSOPHA

fragmentum ex quattuor commentariis de iis quae medice dicta sunt in PLATONIS TIMAEO → in PLATONIS TIMAEUM commentarius

de PRAECOGNITIONE ad Epigenem → de PRAEGNOTIONE ad Epigenem

de PRAENOTIONE → de CONSTITUTIONE artis medicae ad Patrophilum

de PRAENOTIONE ad Posthumum → de PRAEGNOTIONE ad Epigenem

de PRAESAGITURA → de CONSTITUTIONE artis medicae ad Patrophilum

de PRAESAGITURA → de PRAENOTIONE

PRAESAGIUM experientia confirmatum → PRAESAGITIO omnino vera expertaque

PROGNOSTICA de decubitu infirmorum → PROGNOSTICA de decubitu ex mathematica scientia

PROTREPTICUS → ADHORTATIO ad artes addiscendas

compendium PULSUUM Galeno adscriptum → compendium de PULSIBUS

de PULSUUM differentiis libri IV → de differentia PULSUUM libri IV

de praesagitione ex PULSO → de praesagitione ex PULSIBUS libri IV

liber REGIMINIS → de DISSOLUTIONE continua

de REMEDIIS parabilibus libri II → de REMEDIIS parabilibus libri III

de REMEDIIS paratu facilibus liber III → de REMEDIIS parabilibus libri III

de RENUM affectus dignotione → de affectuum RENIBUS insidentium dignotione et curatione

de RESPIRATIONIS usu → de utilitate RESPIRATIONIS liber

SUASORIA ad artes oratio → ADHORTATIO ad artes addiscendas

de bonis malisque SUCIS → de rebus boni malique SUCI

de TEMPORIBUS morborum → de MORBORUM temporibus

ad eos qui de TYPIS scripserunt → adversus eos qui de TYPIS scripserunt

de attenuante VICTUS ratione → de VICTU attenuante

de VIRTUTIBUS cibariorum → de DISSOLUTIONE continua

de dissectione VOCALIUM instrumentorum → VOCALIUM instrumentorum dissectio

INDEX II: PRIMARY AND SECONDARY GREEK TITLES

περὶ ΑΙΡΕΣΕΩΝ τοῖς εἰσαγομένοις → de SECTIS ad eos qui introducuntur

περὶ τῶν τῆς ΑΝΑΠΝΟΗΣ αἰτίων → de causis RESPIRATIONIS

περὶ τῆς ἀρίστης ΑΙΡΕΣΕΩΣ πρὸς Θρασύβουλον → de optima SECTA ad Thrasybulum

περὶ χρείας ΑΝΑΠΝΟΗΣ → de utilitate RESPIRATIONIS liber

περὶ ΑΝΑΤΟΜΙΚΩΝ ἐγχειρήσεων → de ANATOMICIS administrationibus libri I-IX, 5.

περὶ ΑΝΤΕΜΒΑΛΛΟΜΕΝΩΝ → de SUCCEDANEIS

περὶ ΑΝΤΙΔΟΤΩΝ → de ANTIDOTIS libri II

εἰ κατὰ φύσιν ἐν ΑΡΤΗΡΙΑΙΣ αἷμα περιέχεται → an in ARTERIIS natura sanguis contineatur

περὶ ΑΦΡΟΔΙΣΙΩΝ → de VENEREIS

περὶ ΒΔΕΛΛΩΝ, ἀντισπάσεως, σικύας καὶ ἐγχαράξεως καὶ κατασχασμοῦ → de HIRUNDINIBUS, revulsione, cucurbitula, incisione et scarificatione

περὶ τῆς τάξεως τῶν ἰδίων ΒΙΒΛΙΩΝ πρὸς Εὐγενιανόν → de ordine LIBRORUM suorum ad Eugenianum

περὶ τῶν ἰδίων ΒΙΒΛΙΩΝ → de LIBRIS propriis

περὶ ἑπταμήνων ΒΡΕΦΩΝ → de septimestri PARTU

περὶ λεπτυνούσης ΔΙΑΙΤΗΣ → de VICTU attenuante

περὶ ἀρίστης ΔΙΔΑΣΚΑΛΙΑΣ → de optima DOCTRINA

περὶ τῶν ἑαυτῷ ΔΟΚΟΥΝΤΩΝ → de propriis PLACITIS

περὶ φυσικῶν ΔΥΝΑΜΕΩΝ → de naturalibus FACULTATIBUS libri III

περὶ ουσίας τῶν φυσικῶν ΔΥΝΑΜΕΩΝ → de propriis PLACITIS

περὶ ἀνωμάλου ΔΥΣΚΡΑΣΙΑΣ → de inaequali INTEMPERIE

περὶ ΔΥΣΠΝΟΙΑΣ → de difficultate RESPIRATIONIS libri III

περὶ ΕΒΔΟΜΑΔΟΣ → in HIPPOCRATIS de SEPTIMANIS commentaria

περὶ ΕΘΩΝ → de CONSUETUDINIBUS

ΕΙΣΑΓΩΓΗ διαλεκτική → INSTITUTIO logica

ΕΙΣΑΓΩΓΗ ἢ ἰατρός → INTRODUCTIO sive medicus

ΕΙΣΑΓΩΓΗ λογική — INSTITUTIO logica

τίνας δεῖ ΕΚΚΑΘΑΙΡΕΙΝ καὶ ποίοις καθαρτηρίοις καὶ πότε — quos, quibus catharticis medicamentis et quando PURGARE oporteat

περὶ τοῦ πῶς ἐμψυχοῦται τὰ ΕΜΒΡΥΑ — ad Gaurum quomodo animetur FETUS

περὶ τῆς ἰατρικῆς ΕΜΠΕΙΡΙΑΣ — de EXPERIENTIA medica

περὶ τῆς ἐξ ΕΝΥΠΝΙΩΝ διαγνώσεως — de dignotione ex INSOMNIIS

περὶ τῶν ΕΠΙΔΕΣΜΩΝ — de FASCIIS

ἐκ τῶν Γαληνοῦ ὑπομνημάτων περὶ ΕΠΙΔΕΣΜΩΝ βιβλίον — ex commentariis de FASCIIS libellus

τῷ ΕΠΙΛΗΠΤΩΙ παιδὶ ὑποθήκη — pro puero EPILEPTICO consilium

περὶ ΕΥΕΞΙΑΣ — de bono HABITU

περὶ ΕΥΠΟΡΙΣΤΩΝ — de REMEDIIS parabilibus libri III

περὶ ΖΩΩΝ — de ANIMALIBUS

εἰ ΖΩΟΝ τὸ κατὰ γαστρός — an ANIMAL sit quod est in utero

περὶ τῆς κατ' Ἐπίκουρον ἀμυδροῦ [ἀμαυροῦ] ΗΔΟΝΗΣ βιβλία Β' — de caduca VOLUPTATE secundum Epicurum

περὶ ΗΘΩΝ — de MORIBUS

πρὸς Γλαύκωνα ΘΕΡΑΠΕΥΤΙΚΑ — ad Glauconem de MEDENDI methodo libri II

τῶν πρὸς Γλαύκωνα ΘΕΡΑΠΕΥΤΙΚΩΝ βιβλία — ad Glauconem de MEDENDI methodo libri II

ΘΕΡΑΠΕΥΤΙΚΗ μέθοδος — de methodo MEDENDI libri XIV

ΘΕΡΑΠΕΥΤΙΚΗΣ μεθόδου βιβλία — de methodo MEDENDI libri XIV

περὶ ΘΗΡΙΑΚΗΣ πρὸς Παμφιλιανόν — de THERIACA ad Pamphilianum

ὅτι ὁ ἄριστος ΙΑΤΡΟΣ καὶ φιλόσοφος — quod optimus MEDICUS sit quoque philosophus

εἰς τὸ ΙΠΠΟΚΡΑΤΟΥΣ περὶ ΑΓΜΩΝ — in HIPPOCRATIS librum de FRACTURIS commentarii III

εἰς τὸ ΙΠΠΟΚΡΑΤΟΥΣ περὶ ΑΡΘΡΩΝ βιβλίον καὶ Γαληνοῦ εἰς αὐτὸ ὑπομνήματα Δ' — in HIPPOCRATIS de ARTICULIS liber et Galeni in eum commentarii IV

εἰς ΙΠΠΟΚΡΑΤΟΥΣ ΑΦΟΡΙΣΜΟΥΣ — in HPPOCRATIS APHORISMOS VII commentarii VII

πρὸς τὰ ἀντειρημένα τοῖς ΙΠΠΟΚΡΑΤΟΥΣ ΑΦΟΡΙΣΜΟΙΣ ὑπὸ Ἰουλιανοῦ — adversus ea quae a JULIANO in HIPPOCRATIS APHORISMOS enuntiata sunt

τῶν ἹΠΠΟΚΡΑΤΟΥΣ ΓΛΩΣΣΩΝ ἐξήγησις → LINGUARUM seu dictionum exoletarum HIPPOCRATIS explicatio

περὶ τῆς κατὰ τὸν ἹΠΠΟΚΡΑΤΗ ΔΙΑΙΤΗΣ ἐπὶ τῶν ὀξέων νοσημάτων → de VICTUS ratione in morbis acutis ex HIPPOCRATIS sententia

εἰς τὸ ἹΠΠΟΚΡΑΤΟΥΣ περὶ ΔΙΑΙΤΗΣ ὀξέων νοσημάτων καὶ Γαληνοῦ ὑπόμνημα Α΄ Β΄ Γ΄ Δ΄ → in HIPPOCRATIS de DIAETA acutorum librum commentarii IV

εἰς τὸ περὶ ΔΙΑΙΤΗΣ ὑγιεινῆς τῶν ἰδιωτῶν ἹΠΠΟΚΡΑΤΟΥΣ ἢ Πολύβου ὑπόμνημα → in HIPPOCRATIS vel Polybi opus de salubri VICTUS ratione privatorum commentarius

περὶ τῶν οὐχ ἑωραμένων ἹΠΠΟΚΡΑΤΕΙ ἘΚΠΤΩΣΕΩΝ → de HUMERO iis modis prolapso quos HIPPOCRATES non vidit

ἹΠΠΟΚΡΑΤΟΥΣ ἘΠΙΔΗΜΙΩΝ Α΄ καὶ Γαληνοῦ εἰς αὐτὸ ὑπόμνημα Α΄ Β΄ Γ΄ → in HIPPOCRATIS EPIDEMIARUM libros

ἹΠΠΟΚΡΑΤΟΥΣ ἘΠΙΔΗΜΙΩΝ Β΄ καὶ Γαληνοῦ εἰς αὐτὸ ὑπόμνημα Α΄ Β΄ Γ΄ Δ΄ Ε΄ → in HIPPOCRATIS EPIDEMIARUM libros

ἹΠΠΟΚΡΑΤΟΥΣ ἘΠΙΔΗΜΙΩΝ Γ΄ καὶ Γαληνοῦ εἰς αὐτὸ ὑπόμνημα Α΄ Β΄ Γ΄ → in HIPPOCRATIS EPIDEMIARUM libros

ἹΠΠΟΚΡΑΤΟΥΣ ἘΠΙΔΗΜΙΩΝ ΣΤ΄ καὶ Γαληνοῦ εἰς αὐτὸ ὑπόμνημα Α΄ Β΄ Γ΄ Δ΄ Ε΄ ΣΤ΄ → in HIPPOCRATIS EPIDEMIARUM libros

εἰς τὸ ἹΠΠΟΚΡΑΤΟΥΣ κατ᾽ ἸΗΤΡΕΙΟΝ → in HIPPOCRATIS de OFFICINA medici commentarii III

περὶ τοῦ παρ᾽ ἹΠΠΟΚΡΑΤΕΙ ΚΩΜΑΤΟΣ → de COMATE secundum HIPPOCRATEM

περὶ τῶν ἹΠΠΟΚΡΑΤΟΥΣ καὶ ΠΛΑΤΩΝΟΣ ΔΟΓΜΑΤΩΝ → de PLACITIS HIPPOCRATIS et PLATONIS libri IX

περὶ τῶν καθ᾽ ἹΠΠΟΚΡΑΤΗΝ καὶ ΠΛΑΤΩΝΑ ΔΟΓΜΑΤΩΝ → de PLACITIS HIPPOCRATIS et PLATONIS libri IX

εἰς τὸ ἹΠΠΟΚΡΑΤΟΥΣ ΠΡΟΓΝΩΣΤΙΚΟΝ → in HIPPOCRATIS PROGNOSTICUM commentaria III

εἰς τὸ ἹΠΠΟΚΡΑΤΟΥΣ ΠΡΟΡΡΗΤΙΚΟΝ Α΄ → in HIPPOCRATIS PRORRHETICUM I commentaria III

περὶ τῶν καθ᾽ ἹΠΠΟΚΡΑΤΗΝ ΣΤΟΙΧΕΙΩΝ → de ELEMENTIS secundum HIPPOCRATEM libri III

εἰς τὸ ἹΠΠΟΚΡΑΤΟΥΣ περὶ ΤΡΟΦΗΣ → in HIPPOCRATIS librum de ALIMENTO commentarii IV

εἰς τὸ ἹΠΠΟΚΡΑΤΟΥΣ περὶ ΦΥΣΙΟΣ ἀνθρώπου → in HIPPOCRATIS de NATURA hominis commentaria II

Γαληνοῦ εἰς τὸ ἹΠΠΟΚΡΑΤΟΥΣ περὶ ΦΥΣΙΟΣ ἀνθρώπου βιβλίον ὑπόμνημα Α΄ Β΄ → in HIPPOCRATIS de NATURA hominis commentaria II

εἰς τὸ περὶ ΧΥΜΩΝ ʿΙΠΠΟΚΡΑΤΟΥΣ — in HIPPOCRATIS de HUMORIBUS librum commentaria III

περὶ ΚΑΤΑΚΛΙΣΕΩΣ προγνωστικὰ ἐκ τῆς μαθηματικῆς ἐπιστήμης — PROGNOSTICA de decubitu ex mathematica scientia

περὶ ΚΑΤΑΚΛΙΣΕΩΣ νοσούντων προγνωστικά — PROGNOSTICA de decubitu ex mathematica scientia

διαθήκη περὶ τῆς ʾανθρωπείου σώματος ΚΑΤΑΣΚΕΥΗΣ. περὶ τῆς τεσσάρων τῶν ὡρῶν τε καὶ ιβ΄ μηνῶν ΔΙΑΙΤΗΣ — praeceptum Galeni de humani corporis CONSTITUTIONE; de DIAETA quattuor anni tempestatum et duodecim mensium

περὶ ἀρίστης ΚΑΤΑΣΚΕΥΗΣ τοῦ σώματος ἡμῶν — de optima corporis nostri CONSTITUTIONE

περὶ θώρακος καὶ πνεύματος ΚΙΝΗΣΕΩΣ — de MOTU thoracis et pulmonis

περὶ ΚΡΑΣΕΩΝ — de TEMPERAMENTIS libri III

περὶ ΚΡΙΣΕΩΝ — de CRISIBUS libri III

περὶ ΚΡΙΣΙΜΩΝ ἡμερῶν — de diebus DECRETORIIS libri III

περὶ ΚΥΟΥΜΕΝΩΝ διαπλάσεως — de FETUUM formatione

πρὸς ΛΥΚΟΝ — adversus LYCUM libellus

περὶ ΜΑΡΑΣΜΟΥ — de MARCORE

περὶ ΜΕΛΑΓΧΟΛΙΑΣ ἐκ τῶν Γαληνοῦ καὶ ʿΡούφου καὶ Ποσειδωνίου καὶ Μαρκέλλου Σικαμίου τοῦ ʾΑετίου βιβλίων — de MELANCHOLIA ex Galeno, Rufo, Posidonio et Marcello Aetii liber

περὶ τῶν τῆς ἰατρικῆς ΜΕΡΩΝ — de PARTIBUS artis medicativae

περὶ ΜΕΤΡΩΝ καὶ σταθμῶν — de PONDERIBUS et mensuris

περὶ χρείας τῶν ἐν ἀνθρώπου σώματι ΜΟΡΙΩΝ — de usu PARTIUM corporis humani libri XVII

περὶ ΜΗΤΡΑΣ ἀνατομῆς — de UTERI dissectione

περὶ ΜΥΩΝ ἀνατομῆς — de MUSCULORUM dissectione ad tirones

περὶ ΜΥΩΝ κινήσεως — de motu MUSCULORUM libri II

περὶ ΝΕΥΡΩΝ ἀνατομῆς — de NERVORUM dissectione

περὶ τῆς τῶν ἐν ΝΕΦΡΟΙΣ παθῶν διαγνώσεως καὶ θεραπείας — de affectuum RENIBUS insidentium dignotione et curatione

περὶ τῶν ἐν τοῖς ΝΟΣΗΜΑΣΙΝ αἰτίων — de causis MORBORUM liber

περὶ διαφορᾶς ΝΟΣΗΜΑΤΩΝ → de MORBORUM differentiis

περὶ τῶν ὅλου τοῦ ΝΟΣΗΜΑΤΟΣ καιρῶν → de totius MORBI temporibus

περὶ τῶν ἐν ταῖς ΝΟΣΟΙΣ καιρῶν → de MORBORUM temporibus

περὶ τῶν παρὰ φύσιν ΟΓΚΩΝ → de TUMORIBUS praeter naturam

περὶ ἰατρικῶν ΟΝΟΜΑΤΩΝ → de NOMINIBUS medicis

ΟΡΟΙ ἰατρικοί → DEFINITIONES medicae

περὶ ΟΣΤΩΝ τοῖς εἰσαγομένοις → de OSSIBUS ad tirones

περὶ ΟΣΦΡΗΣΕΩΣ ὀργάνου → de instrumento ODORATUS

περὶ ΟΥΡΩΝ ἐκ τῶν Ἱπποκράτους καὶ Γαληνοῦ ἄλλων τινῶν → de URINIS ex Hippocrate Galeno aliisque quibusdam

περὶ ΟΥΡΩΝ ἐν συντόμῳ → de URINIS compendium

περὶ αἰτίας ΠΑΘΩΝ → de causa AFFECTIONUM

περὶ τῶν ἰδίων ἑκάστῳ ΠΑΘΩΝ καὶ ἁμαρτημάτων τῆς διαγνώσεως → de cuiuslibet ANIMI peccatorum dignotione atque medela libellus

πρὸς ΠΙΣΩΝΑ περὶ θηριακῆς → de THERIACA ad Pisonem

περὶ τῶν ἐν τῷ ΠΛΑΤΩΝΟΣ ΤΙΜΑΙΩΙ ἰατρικῶς εἰρημένων ὑπομνήματα τέτταρα → in PLATONIS TIMAEUM commentarius

περὶ ΠΛΗΘΟΥΣ → de PLENITUDINE

ὅτι αἱ ΠΟΙΟΤΗΤΕΣ ἀσώματοι → quod QUALITATES incorporeae sint

περὶ τοῦ ΠΡΟΓΙΓΝΩΣΚΕΙΝ πρὸς Ἐπιγένην → de PRAEGNOTIONE ad Epigenem

περὶ ΠΡΟΓΝΩΣΕΩΣ → de CONSTITUTIONE artis medicae ad Patrophilum

περὶ ΠΡΟΓΝΩΣΕΩΣ → de PRAENOTIONE

ΠΡΟΓΝΩΣΙΣ πεπειραμένη καὶ παναλήθης → PRAESAGITIO omnino vera expertaque

περὶ τῶν ΠΡΟΚΑΤΑΡΚΤΙΚΩΝ αἰτίων → de causis PROCATARCTICIS

πῶς δεῖ ἐξελέγχειν τοὺς ΠΡΟΣΠΟΙΟΥΜΕΝΟΥΣ νοσεῖν → quomodo morbum SIMULANTES sint deprehendendi

Γαληνοῦ παραφράστου τοῦ Μηνοδότου ΠΡΟΤΡΕΠΤΙΚΟΣ λόγος ἐπὶ τὰς τέχνας → ADHORTATIO ad artes addiscendas

ΠΡΟΤΡΕΠΤΙΚΟΣ ἐπὶ ἰατρικήν → ADHORTATIO ad artes addiscendas

ΠΡΟΤΡΕΠΤΙΚΟΣ ἐπὶ τὰς τέχνας → ADHORTATIO ad artes addiscendas

περὶ ΠΤΙΣΑΝΗΣ — de PTISANA

περὶ διαφορᾶς ΠΥΡΕΤΩΝ — de differentiis FEBRIUM libri II

περὶ τῶν παρὰ τὴν λέξιν ΣΟΦΙΣΜΑΤΩΝ — de SOPHISMATIS seu captionibus penes dictionem

περὶ ΣΠΕΡΜΑΤΟΣ — de SEMINE libri II

περὶ αἰτίων ΣΥΜΠΤΩΜΑΤΩΝ — de SYMPTOMATUM causis libri III

περὶ τῆς τῶν ΣΥΜΠΤΩΜΑΤΩΝ διαφορᾶς — de SYMPTOMATUM differentiis

περὶ τῶν ΣΥΝΕΚΤΙΚΩΝ αἰτίων — de causis CONTINENTIBUS

περὶ ΣΥΣΤΑΣΕΩΣ ἰατρικῆς πρὸς Πατρόφιλον — de CONSTITUTIONE artis medicae ad Patrophilum

περὶ τοῦ τῆς σμικρᾶς ΣΦΑΙΡΑΣ γυμνασίου — de parvae PILAE exercitio

περὶ ΣΦΥΓΜΩΝ πρὸς Ἀντώνιον φιλομαθῆ καὶ φιλόσοφον — de PULSIBUS ad Antonium disciplinae studiosum ac philosophum

περὶ τῶν ἐν τοῖς ΣΦΥΓΜΟΙΣ αἰτίων — de causis PULSUUM libri IV

περὶ διαγνώσεως ΣΦΥΦΜΩΝ — de dignoscendis PULSIBUS libri IV

περὶ διαφορᾶς ΣΦΥΓΜΩΝ — de differentia PULSUUM libri IV

περὶ ΣΦΥΓΜΩΝ τοῖς εἰσαγομένοις — de PULSIBUS ad tirones

σύνοψις περὶ ΣΦΥΓΜΩΝ ἰδίας πραγματείας — synopsis librorum suorum de PULSIBUS

περὶ προγνώσεως ΣΦΥΓΜΩΝ — de praesagitione ex PULSIBUS libri IV

περὶ χρείας ΣΦΥΓΜΩΝ — de usu PULSUUM

ΤΕΧΝΗ ἰατρική — ARS medica

περὶ τῶν πεπονθότων ΤΟΠΩΝ — de LOCIS affectis libri VI

περὶ ΤΡΟΜΟΥ καὶ παλμοῦ καὶ σπασμοῦ καὶ ῥίγους — de TREMORE, palpitatione, convulsione et rigore

περὶ ΤΡΟΦΩΝ δυνάμεως — de ALIMENTORUM facultatibus libri III

περὶ εὐχυμίας καὶ κακοχυμίας ΤΡΟΦΩΝ — de rebus boni malique SUCI

περὶ ΤΥΠΩΝ — de TYPIS

πρὸς τοὺς περὶ ΤΥΠΩΝ γράψαντας — adversus eos qui de TYPIS scripserunt

Θρασύβουλος, πότερον ἰατρικῆς ἢ γυμναστικῆς ἐστὶ τὸ ΥΓΙΕΙΝΟΝ — Thrasybulus sive utrum medicinae sit an gymnastices HYGIEINE

῾ΥΓΙΕΙΝΩΝ λόγοι — de SANITATE tuenda libri VI

῾ΥΠΟΤΥΠΩΣΕΙΣ ἐμπειρικαί — de SUBFIGURATIONE empirica

περὶ τῆς τῶν καθαιρόντων ΦΑΡΜΑΚΩΝ δυνάμεως — de purgantium MEDICAMENTORUM facultate

περὶ κράσεως καὶ δυνάμεως τῶν ἁπλῶν ΦΑΡΜΑΚΩΝ — de simplicium MEDICAMENTORUM temperamentis et facultatibus libri XI

περὶ συνθέσεως ΦΑΡΜΑΚΩΝ τῶν κατὰ γένη — de compositione MEDICAMENTORUM per genera libri VII

περὶ συνθέσεως ΦΑΡΜΑΚΩΝ τῶν κατὰ τόπους — de compositione MEDICAMENTORUM secundum locos libri X

περὶ εἰδῶν ΦΙΛΟΣΟΦΙΑΣ — de partibus PHILOSOPHIAE

ΦΙΛΟΣΟΦΟΣ ἱστορία — de historia PHILOSOPHA

περὶ ΦΙΛΟΣΟΦΟΥ ἱστορίας — de historia PHILOSOPHA

περὶ ΦΛΕΒΟΤΟΜΙΑΣ — de VENAE SECTIONE

περὶ ΦΛΕΒΟΤΟΜΙΑΣ πρὸς ᾽Ερασιστρατείους ἐν ῾Ρώμῃ — de VENAE SECTIONE adversus Erasistrateos Romae degentes

περὶ ΦΛΕΒΟΤΟΜΙΑΣ πρὸς ᾽Ερασίστρατον — de VENAE SECTIONE adversus Erasistratum

περὶ ΦΛΕΒΟΤΟΜΙΑΣ θεραπευτικόν — de curandi ratione per VENAE SECTIONEM

περὶ ΦΛΕΒΩΝ καὶ ἀρτηριῶν ἀνατομῆς — de VENARUM arteriarumque dissectione

περὶ ΦΩΝΗΣ — de VOCE

περὶ μελαίνης ΧΟΛΗΣ — de atra BILE

περὶ ΧΥΜΩΝ — de HUMORIBUS

περὶ διαγνώσεως καὶ θεραπείας τῶν ἐν τῇ ἑκάστου ΨΥΧΗΙ ἁμαρτημάτων — de cuiuslibet ANIMI peccatorum dignotione atque medela libellus

περὶ διαγνώσεως καὶ θεραπείας τῶν ἐν τῇ ἑκάστου ΨΥΧΗΙ ἰδίων Παθῶν — de propriorum ANIMI cuiuslibet affectuum dignotione et curatione

ὅτι τὰ τῆς ΨΥΧΗΣ ἤθη ταῖς τοῦ σώματος κράσεσιν ἕπεται — quod ANIMI mores corporis temperamenta sequantur

περὶ ΨΥΧΗΣ — de ANIMA

APPENDIX

The count of words in each treatise has been prepared by the *TLG* staff. The counts should be accurate to within one or two percent. The margin of error should not be greater than 10% at any point.

TREATISE NUMBER	WORD COUNT	TREATISE NUMBER	WORD COUNT	TREATISE NUMBER	WORD COUNT
0057 001	5,579	035	447	069	9,425
002	1,916	036	74,852	070	10,469
003	1,540	037	49,503	071	725
004	6,495	038	11,437	072	3,155
005	5,610	039	2,461	073	2,204
006	12,488	040	522	074	3,324
007	16,897	041	6,921	075	139,748
008	14,041	042	6,354	076	151,410
009	28,740	043	6,880	077	109,828
010	33,097	044	30,714	078	29,182
011	81,466	045	21,866	079	13,643
012	7,186	046	5,666	080	1,444
013	7,847	047	3,772	081	8,792
014	3,748	048	1,653	082	2,663
015	4,919	049	5,853	083	11,596
016	3,532	050	11,588	084	1,424
017	202,070	051	9,521	085	26,958
018	15,313	052	1,949	086	7,132
019	7,176	053	6,047	087	'73,440
020	6,597	054	4,367	088	50,631
021	21,640	055	3,306	089	42,704
022	8,037	056	33,385	090	45,205
023	4,984	057	72,947	091	84,827
024	1,829	058	6,244	092	103,200
025	842	059	44,594	093	8,173
026	1,062	060	32,575	094	8,535
027	8,848	061	33,487	095	55,614
028	9,240	062	37,907	096	10,618
029	7,195	063	16,466	---	
030	6,936	064	36,627	099	46,491
031	4,669	065	28,568	100	44,805
032	99,499	066	164,227	101	43,602
033	14,352	067	23,838	102	15,413
034	1,831	068	6,228	103	4,181

TREATISE NUMBER	WORD COUNT	TREATISE NUMBER	WORD COUNT	TREATISE NUMBER	WORD COUNT
104	6,501	005	8,648	031	2,216
105	2,042	---		032	2,243
106	9,990	009	1,752	033	3,987
107	1,078	---		034	971
---		012	19,773	035	3,102
111	3,416	---		036	1,333
---		020	2,222	037	6,155
114	700	023	909	---	
115	917	024	6,978	041	15,749
---		---		042	12,447
121	1,158	026	2,118	043	18,300
0530 002	3,926	---		---	
---		029	36,996	045	8,526

Collecting Medical Books: Practical and Theoretical Considerations with an Annotated Bibliography

W. BRUCE FYE

'It is hard for me to speak of the value of libraries in terms which would not seem exaggerated. Books have been my delight these thirty years, and from them I have received incalculable benefits...' William Osler (1901)[1]

MEDICINE being a bookish profession, the collection of medical books has a long tradition among physicians.[2] The historical literature of medical science and practice is remarkably rich and varied. New discoveries, insights, and interpretations have been recorded and transmitted by books and journals for centuries. This permits the modern physician or historian to trace the evolution of thought and understanding of virtually any subject of medical interest. It is not surprising, therefore, that members of the medical profession should become interested in collecting the documents which illustrate this evolution. In most instances, book collecting either developed from, or led to, an interest in the history of medicine. Temkin has noted, for example, in the case of Harry Friedenwald, the noted Baltimore ophthalmologist, bibliophile, and medical historian: '...it was his large collection that stimulated Dr. Friedenwald towards his [historical] researches, and these researches, in turn, stimulated him to increase year by year his riches of manuscripts, incunables, and other books...'[3]

Once one has decided to assemble a collection of medical books, the fundamental question is what to collect. Medical bibliophiles of earlier generations could concentrate on medical manuscripts, incunabula, and 16th century books which came on the market frequently until the early 20th century. In recent decades these early medical books have largely become the property of institutions and are now very difficult to obtain, even by the expenditure of great sums of money. While physicians as a group can indulge their hobbies more than many of our society, few are able to spend the $10,000 a year which J. K. Lilly set

1. W. Osler, "Books and Men" *Boston Med. & Surg. J.* 144(1901):60-61.

2. For an interesting historical overview of private collectors of medical books over the past five centuries see J. L. Thornton, "Private Medical Libraries," in: J. L. Thornton, *Medical Books, Libraries, and Collectors,* 2nd ed. (London, 1966), 264-298.

3. O. Temkin, "Harry Friedenwald" *Bull. Hist. Med.* 25(1951):185-190.

aside for the purchase of medical books in 1954.[4] This discussion will focus upon materials which can be obtained currently by the collector who must limit his purchases to conform to some budget. Considerations of availability and cost compel the book collector to be selective in his buying.

It is important that the collector define a limited number of subjects which will be the theme of his collection; I shall call this *focused collecting*. The focused approach to collecting antiquarian medical books has practical as well as theoretical advantages. By defining a subject around which the collection may be centered, the collector is able to familiarize himself with the reference works in that field. The subject and scope of the collection determine the nature and extent of the reference collection. It may consist of fewer than a dozen volumes or may number in the hundreds.[5] A selection of basic reference works which should be familiar to all medical book collectors is included in Appendix II. The collector who is versed in the history of his field of interest is more likely to form a useful and valuable library than the one who buys impulsively and indiscriminately. Further, a cohesive subject collection which contains a nucleus of relevant reference works will facilitate historical research which the collector may desire to undertake. The fine institutional medical libraries owe much to the great book collectors whose knowledge, skill, and resources were devoted to the formation of specialized collections.[6] While interesting to some collectors, the technical aspects of bibliography are usually left to the antiquarian bookseller or bibliographer. Many of the great medical book collectors of the early part of this century acknowledged the important assistance they received from members of the antiquarian book trade and librarians.[7]

The focus of a specialized collection is best determined by the collector's interests and by the availability of books. The theme may be a medical specialty, a geographic area, a particular period, a biological or medical science, a major discovery, or any of dozens of other areas, limited largely by the imagination of

4. D. A. Randall, "The J. K. Lilly Collection of Original Appearances of Classical Works in the History of Medicine and Surgery." in: *Medicine — An Exhibition of Books Relating to Medicine and Surgery from the Collection Formed by J. K. Lilly,* (Bloomington: Indiana University, 1965), 3-9.

5. Elsewhere I have outlined a "core" collection of references for the history of internal medicine. See W. B. Fye, "The Literature and History of Internal Medicine — an Annotated Bibliography" *Ann. Int. Med.* 87(1977):123-128.

6. H. W. Jones, "The Value of Special Collections in Medical Libraries" *Bull. Med. Libr. Assoc.* 30(1941):40-55.

7. An interesting perspective on medical bookmen has been published by a prominent contemporary medical librarian, see T. E. Keys, "Bookmen in Biology and Medicine I have known" *J. Hist. Med.* 30(1975):326-348.

the collector. Another general area of collecting may be termed *interface* collecting; this term embraces physicians or medicine in their relation to other areas of culture. Examples are physician-explorers, physician-musicians, literary physicians, physician-artists, and women in medicine. A broad area is the author collection. The guideline in building such a collection is the intent to obtain the writings of an individual as well as works about him. The nature of such a collection will be determined by several factors, including the period in which the subject lived, and whether he published his work in books or in periodicals. The key reference material for building an author collection is a bibliography of the works of the individual, if it exists, and any biographical material relating to him.[8] Author collections formed early in this century have led to the preparation of important individual bibliographies.[9] These efforts bear witness to the potential which focused author collecting affords for scholarly contributions to the literature of medical history.

Milestone collecting may be defined as collecting the most important works in a given field, those that represent major achievements in discovery or understanding. This approach was popularized by William Osler and is illustrated in the catalogue of his magnificent collection, which was bequeathed to McGill University in 1919. Because of the scarcity and costs, this approach is no longer possible for medical science as a whole. Within a sub-specialty or otherwise limited area of medicine, milestone collecting is still possible, however. Knowledge acquired about his specialized field coupled with the conscientious use of reference works may well permit the physician-collector to assemble a collection of important books in a limited field, often at reasonable cost.[10] Although medical and scientific classics now command high prices, the knowledgeable bibliophile recognizes that these milestones represent only the tip of the iceberg. Significant works of slightly lesser importance may be obtained at low cost if the collector is diligent. Since certain subject areas are the result of fads, the collector should be aware of the influence that sudden popularity of a particular subject may exert on the availability and cost of books. Certain trends in book collecting can be predicted, such as the increased interest in material relating to anesthesia around 1946 (the centennial of the discovery of ether

8. J. L. Thornton, *A Select Bibliography of Medical Biography*, 2nd ed., (London, 1970).

9. Cf. H. W. Cushing, *A Bio-bibliography of Andreas Vesalius* (New York, 1943). See also several individual bibliographies published by Geoffrey Keynes.

10. Cf. E. Bedford, "On Collecting a Cardiological Library," in: *The Evan Bedford Library of Cardiology* (London: Royal College of Physicians, 1977). The author (a physician-historian) describes how his important collection of works dealing with the circulation was built over half a century.

anesthesia) and the sudden interest in anything even remotely related to acupuncture occasioned by its recent re-introduction into Western medicine. The prudent collector will avoid areas which possibly are falsely inflated.

After the collector has decided on the basis of author and content that a book is desirable, there are certain important considerations relating to the book as an object. Among these is the concept of rarity. Many scholars have attempted to define rarity and most acknowledge that this is a difficult, if not impossible, task. John Shaw Billings, in his address 'Rare medical books' (1890) made several points which remain relevant:

> The term rare as applied to medical books has a relative and not an absolute value... There is no necessary connection between the rarity of a book and its cost, nor between either the rarity or cost and actual interest and value, either historical or practical. The cost of a rare book depends mainly upon whether it is a book that is sought for, that is, in demand by collectors. If there is no demand its price may be very small...[11]

The term rare fascinates many bibliophiles, one must try to remain objective when this word in flaunted by the book dealer or the fellow collector. Many factors contribute to rarity, including the size of the original press-run, attrition through deterioriation or purposeful disposal, the time between the publication of a book and its identification as a collectible item, and perhaps most important, the current demand for the book. As Billings noted, rarity is a relative concept and availability is equally important to the collector. Many American medical contributions were published in smaller numbers than the issue of the *Boston Medical and Surgical Journal* which contained Bigelow's announcement of ether anesthesia, but this volume is almost unobtainable, since most copies have been in the hands of collectors or institutions for decades.[12] Hence, the absolute number of copies printed, or even in existence, may be relatively unimportant when an attempt is made to obtain one.

What determines whether a book is collectible? This is a labile concept determined by caprice of collectors and by trends in medicine. Whereas major contributions or classics will always be in demand, other books or subjects may attract only fleeting attention. Examples of this include failed fads, such as various medical sects — many of which have a large literature that is now in little demand — and medical problems which have been solved or are of less general interest than formerly. Examples of the latter group are books on tuberculosis and syphilis, infectious diseases which have been largely controlled with chemotherapy in the last few decades. Relatively few physicians are now interested in these diseases clinically, and there is proportionately less interest in

11. J. S. Billings, "Rare Medical Books" *Johns Hopkins Hosp. Bull.* 1(1890):29-31.

12. H. J. Bigelow, "Insensibility During Surgical Operations Produced by Inhalation" *Boston Med. & Surg. J.* 35(1846):309-317, 379-382.

the older literature on these diseases. Another example is the declining interest in works of secondary importance and of late editions of books written in Greek or Latin. This is explained, in part, by the subtotal extinction of physicians who can read the classical languages. Conversely, as new areas of biological and medical science are developed and professionalized, interest in the origins of these fields sometimes emerges. This may lead to the appreciation of forgotten books and of books formerly considered obscure or insignificant. An example is the interest in early attempts at resuscitation which has accompanied recent clinical developments in this area.[13] Obviously, the price of these books is affected by current perception of their collectibility and by the demand among collectors.

Another factor is the age of a book. Today there is a mysterious period of about five to fifty years after publication; during this strange time there may be very little interest in all but the most important monographs. Most volumes in this interim are considered too old to be useful yet too new to be collectible. Modern monographs of major significance, actively sought, are easy to mention, but these are outnumbered by swarms of textbooks and seemingly insignificant publications. The working libraries of most medical practitioners contain few, if any, collectible medical books. The literature of medicine being highly specialized, and the general antiquarian book dealer in most instances cannot hope to determine which books are significant. This had led to a widespread lack of interest among general book dealers in handling medical books; this in turn causes the destruction of thousands of medical volumes annually. Further, ever-increasing budgetary constraints in institutional libraries, the ever-present problem of storage, and a growing demand for narrow relevance, have caused many librarians to discourage the donation of physicians' libraries. Charitable organizations which recycle society's goods have often come to the same conclusion: recent medical books can rarely be sold. The effect of these conditions will become increasingly clear as collectors focus on 20th century contributions to medical thought, only to find that many of the publications of this period have become hard to find.

A point of major importance in many areas of book collecting, and critical in literary collecting, is that of the edition. The demand and price may hinge on special issue points, which distinguish the first from later printings. In general, medical book collectors and dealers are not greatly concerned with minutiae of this kind. There is a good explanation for this. When a literary book is published it represents a final product of creativity and is, therefore, static. Later issues or editions are usually replications, with minor alterations or corrections, of the first edition. Such is not the case with books in medicine and science, which are characterized by discovery and growth. Usually a specialized medical monograph

13. K. G. Huston, *Resuscitation — An Historical Perspective* (Park Ridge, Illinois: Wood Library Museum, 1976).

is published in a small printing of one or two thousand copies. If a second edition appears, it often contains new material which may be more valuable than that included in the first edition. An early example is Laennec's *Traité de l'auscultation médiate...*,[14] which was first published in 1819. The second edition, which appeared in 1826, contained additional information on pathological anatomy, diagnosis, and treatment. In medical book collecting, not only is the first edition of a work important, but later editions often deserve attention also.

A factor important in determining the rarity or availability of a book is the delay between its publication and the recognition that it is worth preserving. With some early medical books this poses less of a problem when one considers the great folio editions or those illustrated with engravings. As John Shaw Billings noted:

> As regards size, the ancient folios, especially those relating to systemic medicine or surgery or including the commentaries on the older authors, are much less rare than the pamphlets or small popular treatises of the same dates. Many of the latter were worn out by constant thumbing or were considered of little value at the time and were not preserved, while the huge folios, in their wood and hog-skin covers, do not often seem to have been read so much as to injure them seriously, and were more apt to be preserved and pass into the hands of the second-hand bookseller...[15]

Some books were identified as major contributions as soon as they were published. This led to significant numbers of them being preserved in private or institutional libraries. An example is William Beaumont's *Experiments and Observations on the Gastric Juice, and the Physiology of Digestion*.[16] Osler notes: *'The Experiments and Observations...* attracted universal attention, both at home and abroad...' and three thousand copies of the first edition were printed.[17] This book is not rare in terms of absolute number, but because it is in great demand the price has risen steadily, making it one of the most expensive American medical books. William Osler's classic textbook, *The Principles and Practice of Medicine*[18] was also received enthusiastically by the medical community. Further, as a basic textbook it commanded a larger audience than most specialized monographs. The first printing alone ran to three thousand copies, while the first edition in its entirety numbered more than ten thousand copies.[19] When later editions

14. R. T. H. Laennec, *De L'auscultation Mediáte* (Paris, 1819).

15. Billings (note 11), pp. 29-31.

16. W. Beaumont, *Experiments and Observations on the Gastric Juice and the Physiology of Digestion* (Plattsburg, 1833).

17. W. Osler, "William Beaumont. A Pioneer American Physiologist" *JAMA* 39(1902):1223-1231. See also, G. Rosen, *The Reception of William Beaumont's Discovery in Europe* (New York, 1942).

18. W. Osler, *The Principles and Practice of Medicine* (New York, 1892).

19. H. W. Cushing, *The Life of Sir William Osler* (Oxford: Oxford University Press, 1925).

appeared, however, the stage was set for the eventual disposal of a considerable percentage of the first edition. Other books not identified as significant until decades after their original date of publication were not as likely to be preserved and may be especially scarce. An example is Auenbrugger's *Inventum novum ex thoracis humani...* published in Latin in 1761.[20] This classic contribution to physical diagnosis was largely ignored by the medical world of its day. Not until Corvisart translated the work into French in 1808 (an earlier French translation by Roziére received little attention) and added a commentary, did it achieve the recognition that it deserved.[21] This delay undoubtedly accounts in part for the scarcity of the first edition.

Other factors which may explain the rarity of a particular book include disasters — natural or other. The first edition of Robert Boyle's *New Experiments and Observations Touching Cold*[22] is rare because most of the copies were destroyed in 1666 in the Great Fire of London.[23]

Another factor which may influence demand and therefore price, is the availability of reprint editions. While some books are prized and sought as objects, others are in demand because of their content. Certain reference works in medical history have recently been reprinted; this tends to lower the price of the original. An example is James Thacher's classic *American Medical Biography,* [24] of which Osler said in 1902: 'A rare volume now, but worth its price....'[25] Today, the original edition is just as rare in absolute numbers, but is certainly in reduced demand since the contents are available in reprint. The effect on the price of a book such as this may be significant, whereas the publication of a facsimile of Harvey's *De motu cordis*[26] would have no influence on the demand for, or price of, the original, one of the most important books ever published, and highly prized as an object.

---

20. L. Auenbrugger, *Inventum Novum ex Percussione Thoracis Humani ut Signo Abstrusos Interni Pectoris Morbos Detegendi* (Vienna, 1761).

21. L. Auenbrugger, *Nouvelle Méthode pour Reconnaître les Maladies Internes de la Poitrine par la Percussion de cette cavité*...traduit du Latin et commenté par J. N. Corvisart (Paris, 1808).

22. R. Boyle, *New Experiments and Observations Touching Cold, or an Experimental History of Cold*....(London, 1665).

23. L. T. More, *The Life and Works of the Honourable Robert Boyle* (New York: Oxford University Press, 1944).

24. J. Thacher, *American Medical Biography* (Boston, 1828).

25. W. Osler, "Some Aspects of American Medical Bibliography" *Bull Med. Libr. Assoc.* 1(1902):19-32.

26. W. Harvey, *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus* (Frankfurt, 1628).

In antiquarian collecting, association copies have received less attention in the medical book world than they deserve. These are books which bear evidence of being specially related to the author, editor, or subject of the book. Books which are autographed by the author are the most obvious type of association copy. Since many medical books bear ownership inscriptions of several owners as they have been passed on through the years, it is possible occasionally to construct an interesting genealogy of possession. If a physician made important contributions to a particular field, books which pertain to this field and were once in his library (as witnessed by his signature or bookplate) are important association copies. During the last few decades the libraries of such important physicians as Weir Mitchell, Howard Kelly, and Herbert M. Evans, have been sold at public auction. An interesting hunt for Joseph Lister's library, sold at auction in 1913, was recently described by Owen Wangensteen, who also notes the historical significance of catalogues of important physicians' libraries.[27] Bookplates provide another opportunity for identifying earlier owners of medical books. The collecting of bookplates is a specialized area adorned by its own literature, and the medical bibliophile should be aware of this aspect of collecting.[28]

The condition and appearance of a medical book should be reflected in its price. There is no universally accepted system of grading the condition of books. The process is subjective, and there is great variation in what the individual collector or dealer will consider acceptable condition. Any book which is not complete is designated as imperfect, but if a book is very scarce, the acceptance of such a copy may be necessary. Many books from the seventeenth and eighteenth centuries contained elegant engraved portraits of the authors which have been removed and framed or otherwise separated from their original home. This leads booksellers to remark in their catalogues: 'portrait lacking, *as usual*.' The absence of plates or leaves from the text is usually considered a more serious defect.

Guidelines in determining the condition of medical books are somewhat different from those applied to other types of books, such as literary first editions or private press books. While dustwrappers are unusual in medical books, bookplates, ownership inscriptions, and marginal notations are relatively common. As discussed earlier, these may add to the historical interest of a particular volume. Since many medical books have been used as working copies, they often show more signs of wear than their literary counterparts, which may have been read only once or twice. The terms *original, edition*, and *contemporary binding* are important to the serious collector.[29] When to rebind or repair a book

27. O. H. Wangensteen and S. D. Wangensteen, "Lister, his Books, and Evolvement of his Antiseptic Wound Practices" *Bull. Hist. Med.* 48(1974):100-128.

28. Samuel X Radbill, *Bibliography of Medical ex Libris Literature* (Los Angeles, 1951).

29. See P. Gaskell, "Edition Binding" *A New Introduction to Bibliography* (New York: Oxford University Press, 1972), 231-250.

in a worn or deteriorating original binding is as controversial as the restoration of paintings and the refinishing of antiques. The scarcity of craftsmen and the increased cost of repairing or rebinding should be considered when one decides to buy a book that needs such attention. Again, availability is important; it may be necessary to settle for a worn or broken copy if a better one is not in prospect.

Many antiquarian medical books have been in institutional libraries and bear library marks. These markings range from a small unobjectionable ownership stamp to widespread identification stamps on title, text, and illustrations. These defects must be judged individually, and usually are taken into consideration when the book is evaluated by antiquarian book dealers. Most collectors are happy that some books are being de-institutionalized and thereby enter the market once again in this time of general scarcity; hence they are quite willing to accept ex-library copies that are complete and not objectionably defaced. As institutional budgets become tighter and as book prices continue to climb, it is probable that more books which have been in libraries will enter the general market. Harvey Cushing recognized the value of this to both the institution and the private collector.[30]

Periodical publications deserve increased attention from medical book collectors. It has been asserted that 'by the last half of the 19th century all of the important [medical] contributions were being printed in journals...'[31] Unquestionably the scholarly journal has become the preferred channel for the transmission of new knowledge. This medium for publication began to displace the monograph and the book in the middle of the 19th century in Europe and in the late 19th and early 20th centuries in America.[32] A glance through the Garrison-Morton bibliography will corroborate these statements.[33] For the individual who wishes to collect the milestones of the last hundred years there is no alternative other than to attempt to obtain such periodical material, in the form of journal volumes, single issues, extracts, or offprints. Many book collectors have an aversion to pamphlet material and detest journal extracts or offprints. Such items, it is said, are difficult to store, not because of their bulk, but because they tend to become misplaced or lost among books. Periodical contributions are usually more difficult to obtain than printed books. Individual volumes of periodicals rarely come on the market; moreover, they are bulky and may contain mainly material not of interest to the collector who seeks a special

30. J. F. Fulton, "On Being a Literary Executor" *J. Neurosurg.* 4(1947):1-6.

31. D. A. Kronick, "Collecting Historical Medical Books" *Bull. Cleveland Med. Lib.* 9(1962):67-76.

32. For an overview of the development of American medical literature, see N. Shaftel, "The Evolution of American Medical Literature" *Int. Rec. Med.* (July 1958):431-454.

33. L. T. Morton, *A Medical Bibliography* (Garrison and Morton) *An Annotated Checklist of Texts Illustrating the History of Medicine,* 3rd ed., (Philadelphia, 1970).

article. Author's offprints are often exceedingly scarce, since they are printed in very small quantities for personal distribution. Author collections often are of necessity oriented toward the periodical contributions of one writer. In some instances the periodical is the only form in which the author published his material. For example, William Halsted's numerous publications appeared only in journals.

Another area of medical collecting that has been largely ignored is medicine of the 20th century, a period which has witnessed more great discoveries than any of its predecessors. The 20th century presents a special challenge to the historian, the book collector, and the dealer, since it is difficult to discriminate the important monographs from the unimportant, in as much as perspective is lacking and specialized sources of reference for this period are very limited. Here, the person who has had medical training and is interested in the historical development of his field is well equipped to identify and preserve important publications, which may well be inexpensive. Some milestones such as the discovery and application of penicillin, and some major figures such as Harvey Cushing, William Osler, Sigmund Freud, and Walter Reed are known to the general antiquarian book world, but these are only a small fraction.[34]

How and where to obtain medical books is a major problem for collectors. To some extent the method of obtaining books is dependent on individual philosophies of collecting. It may consist of active participation in what may be called the fun of the hunt; this applies to the collector who visits flea markets and second-hand stores. Another method is that of the armchair collector, whose activity is limited to the catalogue, telephone and checkbook. Both may be successful but, the latter is likely to have the advantage in the collection of antiquarian medical books. Medical book collecting is a highly specialized field, and the most efficient and reliable source of antiquarian medical books is the dealer who specializes in medical material. There are about a dozen such specialists in America.[35] Most issue catalogues at irregular intervals and some will attempt to obtain specific items on request. The catalogues range from uninspired short-title lists to handsome books or booklets which contain valuable historical and bibliographical information and are themselves collectible.[36] The

34. Cf. L. T. Morton, ed., *Use of Medical Literature,* 2nd ed., (London, 1977). A recent guide to current literature on medicine which contains extensive bibliographical information on important medical texts in all subspecialties as well as information on periodicals and historical surveys.

35. A recent publication which includes the names of many American and international medical book dealers is "Special Medical Issue" *AB Bookman's Weekly,* 63(February 26, 1979):1507-1688. In addition, this issue contains several articles of interest including G. Annan, "Collection in the History of Medicine," 1507-1526.

36. Cf, "Medicine and Science — A Bibliographic Catalogue of Historical and Rare Books from the 15th to the 20th Century" *Catalogue 91* (London: William Dawson, 1958).

medical books specialist performs a screening function; in addition, by the extent, accuracy and objectivity of his annotations, he may contribute valuable insight.

The general antiquarian or used-book store often includes a small section devoted to medical books. In most instances these prove to be 20th century books dealing with popular medicine, self-help guides, and related material of little interest to the serious medical collector. Nevertheless, occasional finds make this source valuable to the medical bibliophile. The collector should recognize that books may be misplaced; neurology may be among the books on psychology and geographical medical history among Americana or books on travel. The interface collector should be specially aware of this; for example, books by or about physician travellers are more likely to be among the travel books than among the medical books. These comments also apply to general antiquarian book catalogues, which occasionally list interesting medical books.

A few auction houses around the world hold regular auctions of medical books, most of the bidding being done by dealers. In recent years however, greater participation by individual collectors has been noticeable at these auctions. Since books bought at auction are usually not returnable, it is especially important for the purchaser to be familiar with the book in question. Many collectors advocate bidding through an agent (usually a book dealer) who, for a commission, will execute bids and make judgments regarding condition and related considerations.[37]

The cost of antiquarian medical books is important to most medical bibliophiles. Everyone involved in antiquarian medical books, be he librarian, dealer, or collector, cannot help being impressed by the recent inflation of prices in the world of antiquarian medical books.[38] In 1959 it was noted: 'There are fads in books as in clothes: Vesalius boomed after 1943, the *Fabrica* steadily rising from $500 twenty years ago to about $2,100 today....'[39] This book sold at auction in 1975 for $17,500[40] and a copy was offered for £18,000 in 1979.[41] While this degree of inflation is not representative of medical books, increase in price has been impressive and consistent for decades. Unquestionably the demand for

37. For a vivid account of a recent medical book auction of major significance, see H. Crawford, "Royal Medical Society of Edinburgh: Sale of its Library at Sotheby's," *Bull. Med. Libr. Assoc.* 58(1970):531-547.

38. An article published nearly 25 years ago by one of America's most prominent medical librarians emphasizes this point and contains many other valuable observations on the prices of medical books. See G. L. Annan, "Old Books and Their Prices" *Bull. Med. Libr. Assoc.* 43(1955):455-464.

39. "Bibliotheca Medica," *M.D.* (August 1959):137-140.

40. "Herbert McLean Evans Library of Medical Classics" *Sale Number 984.* (New York: Swann Galleries, 1975).

41. "History of Medicine" *Catalogue 274* (London: Dawsons, 1979), Item 258.

antiquarian medical books is increasing. Among the possible explanations are the increasing number of physicians, heightened awareness of the investment potential of medical books, and, one would hope, a degree of influence from the growing professionalization of the field of medical history. Just as antiques, paintings, and oriental rugs have become targets for growing numbers of investors, so too, have books become objects of speculation. The influence of this small but powerful subgroup of collector-investors is felt by all medical bibliophiles. Largely for this reason the milestones have gone beyond the reach of most collectors, and the trend presents a special challenge to the collector who is interested in the book and its content rather than its market potential. Many books of significance can be obtained at relatively low prices, however, and the more knowledgeable the collector, the better able he is to decide if a price is fair. Price-guides exist but they are inadequate and occasionally misleading.

The organization of a personal collection of medical books, a highly individual matter, depends on several factors including the size of the collection, the space available, and the scope and purpose — e.g. whether a working collection or a "museum" collection. Many patterns of organizations are possible, as witnessed by the arrangement of the various printed catalogues of individual and institutional collections. The knowledgeable collector who has selected a limited number of subjects will best be able to select a logical arrangement for his library. Reference works should be grouped together and should be placed in the collector's work area. Organization by subject is probably the most convenient system for collections of moderate size, i.e., 100 to 1,000 volumes. Often the most important or valuable books are segregated and given the luxury of a special location.

The care and preservation of books is beyond the scope of this review but one which the bibliophile must consider attentively. Unfortunately, this aspect is often overlooked by institutional and private collectors alike. This has been true for centuries and to some extent accounts for the scarcity of certain books which deteriorated through neglect. Certain simple measures require little investment of time or money and should be self-evident. Details regarding book preservation are included in volumes cited in Appendix II.

While most collectors are able to control their hobby, there are some who cannot. These are the bibliomaniacs or collectors who manifest their madness by collecting intemperately. Physicians are well represented in this group. Osler has characterized the medical bibliomaniac:

> ...a class of men in the profession to whom books are dearer than to teachers or practitioners — a small, a silent band, but in reality the leaven of the whole lump. The profane call them bibliomaniacs, and in truth they are at times irresponsible... Loving books partly for their contents, partly for the sake of the authors, they...keep alive the sentiment of historical continuity in the profession... We need more men of their class.[42]

42. W. Osler, "Books and Men" *Boston Med. & Surg. J.* 144(1901):60-61.

Osler was a bibliomaniac, as were a number of the physician-collectors whom he deeply influenced, among them Harvey Cushing, Howard Kelly, and John Fulton. The stories of how these men and others built up their great collections are fascinating.[43] In addition, these accounts depict dramatically the changes that have occurred in the antiquarian book world in just a few decades.[44]

Medical book collecting can be a rewarding avocation which may facilitate historical research, complement current knowledge, or simply be a hobby. A basic knowledge of fundamentals of medical book collecting is necessary if the collector is to assemble a significant or useful library. Many of the practical and philosophical considerations touched upon in this review are considered more fully in the appendices which follow.

Cardiology
The Marshfield Clinic
1000 N. Oak Avenue
Marshfield, Wisconsin 54449

---

43. See Appendix I.

44. For a dramatic contrast between book collecting today and sixty-five years ago, see F. H. Garrison and F. Neumann, "How to Collect Old Medical Books in Europe — Where to Go and What to Look For," *JAMA* 57(1911):895-898.

APPENDIX I

MAJOR MEDICAL BOOK COLLECTORS OF THE TWENTIETH CENTURY: THE DEVELOPMENT OF THEIR COLLECTIONS AND PRINTED CATALOGUES OF THEIR LIBRARIES

EVAN BEDFORD (1898-1978). E. Bedford, "On Collecting a Cardiological Library," in: *The Evan Bedford Library of Cardiology —Catalogue of Books, Pamphlets and Journals* (London: Royal College of Physicians, 1977) pp. viii-x.

HARVEY CUSHING (1869-1939). L. Baumgartner, "Harvey Cushing as a Book Collector and Litterateur," *Bull. Hist. Med.* 8(1940):1055-1066. Also, *The Harvey Cushing Collection of Books and Manuscripts* (New York, 1943).

HARRY FRIEDENWALD (1864-1950). O. Temkin, "Harry Friedenwald," *Bull. Hist. Med.* 25(1951):185-190. Also, H. Friedenwald, *Jewish Luminaries in Medical History and a Catalogue of Works Bearing on the Subject of the Jews and Medicine from the Private Library of Harry Friedenwald* (Baltimore: Johns Hopkins, 1946).

J. K. LILLY, JR. (1893-1966). J. K. Randall, "The J. K. Lilly Collection of Original Appearances of Classical Works in the History of Medicine and Surgery," in: *Medicine — An Exhibition of Books Relating to Medicine and Surgery from the Collection Formed by J. K. Lilly* (Bloomington: Indiana University, 1965) pp. 3-9.

H. WINNETT ORR (1877-1956). L. M. Prime, and K. H. Worst, "Winnett Orr-the Collector," in: *A Catalogue of the H. Winnett Orr Historical Collection and Other Rare Books in the Library of the American College of Surgeons* (Chicago: American College of Surgeons, 1960) pp. xiii-xvi.

WILLIAM OSLER (1849-1919) W. Osler, "The collecting of a library," in: *Bibliotheca Osleriana — A Catalogue of Books Illustrating the History of Medicine and Science Collected, Arranged, and Annotated by Sr. William Osler, Bt. and Bequeathed to McGill University.* (Oxford: Oxford University Press, 1929) pp. xxi-xxxii.

LAWRENCE REYNOLDS (1189-1961). H. L. Holey, "Lawrence Reynolds, M.D. the Bibliophile," in: *Rare Books and Collections of the Reynolds Historical Library — A Bibliography* (Birmingham: University of Alabama, 1968) pp. xi-xiii.

ERIK WALLER (1875-1955). H. Sallander, "Introduction," to *Bibliotheca Walleriana — the Books Illustrating the History of Medicine and Science Collected by Dr. Erik Waller....* (Stockholm: 1955) pp. xi-xiii.

APPENDIX II

AN ANNOTATED BIBLIOGRAPHY OF REFERENCE WORKS OF INTEREST TO THE MEDICAL BOOK COLLECTOR

BOOK COLLECTING AND BIBLIOGRAPHY

J. Carter, ***ABC for book collectors.*** 5th ed. (New York, 1966).

A useful glossary of terms frequently encountered in books dealers' catalogues, bibliographies and other descriptions of books. Several hundred terms are arranged alphabetically and are accompanied by lucid definitions. Terms relating to the following general areas are included: binding styles, typographical details, book design, and condition.

J. F. Fulton, ***The Great Medical Bibliographers.*** Philadelphia: Univ. of Pennsylvania, 1951. O.P.*

An interesting historical narrative of the development of great libraries over the centuries and of the men who built and catalogued them. The major medical bibliographies from the birth of printing through the mid-20th century are considered. The book includes a name index and numerous facsimile title pages and portraits.

P. Gaskell, ***A New Introduction to Bibliography*** (New York: Oxford Univ. Press, 1972).

This interesting volume deals with the development of printing and the technical aspects of book production. It gives valuable insight into the history of books and book trade. The work is broken down into two major chronologic periods: the hand-press era (1500-1800) and the machine press era (1800-1900). Many of the technical descriptive terms and symbols of bibliographical practice which have evolved over the centuries are noted. Specific aspects of book production considered include printing styles, paper, binding, press-work and illustrations. A valuable bibliography of secondary sources relating to the subjects covered is included (pp. 293-413). The book is well illustrated and includes a useful index.

---

*O.P. indicates the original edition is out-of-print. If a reprint edition of the book is currently in print, this fact is noted.

T. E. Keys, *Applied Medical Library Practice* (Springfield, 1958). O.P.

Although written primarily for reference librarians, this informative book contains several chapters which are of interest as well to the private collector. There are sections dealing with the development of private medical libraries, a valuable historical overview and informal checklist of important publications in American medicine over the past 250 years, and a bibliography of medical books which have been published in facsimile editions. Admittedly, some aspects of the book are outdated, but the sections mentioned above remain useful.

J. L. Thornton, *Medical Books, Libraries and Collectors — A Study of Bibliography and the Book Trade in Relation to the Medical Sciences*, 2nd. ed. (London, 1966).

A scholarly survey of the individuals and institutions concerned with the production, distribution and collection of medical books over the four centuries of printing. The book covers a large amount of material and is, of necessity, somewhat superficial. The first half traces chronologically the development of the book trade and the publication of important medical books from the 15th to 19th centuries. Other chapters deal with the growth of periodical literature and private medical libraries. Valuable footnotes, an extensive bibliography of secondary sources, and a name-subject index are included.

SOURCES USEFUL IN SELECTING AND IDENTIFYING MEDICAL BOOKS, THEIR AUTHORS AND THEIR SIGNIFICANCE.

COMPREHENSIVE AND GENERAL HISTORIES OF MEDICINE

A. Castiglioni, *A History of Medicine*, trans. and ed. E. B. Krumbhaar. 2nd ed., (New York: Knopf, 1947). O.P. (Reprint of 1st ed. of 1941 New York: Jason Aronson, 1973).

A book similar in scope to that of Garrison. This well illustrated survey is especially valuable for the development of European medicine. After a general chronological overview of medical history, a number of medical and surgical subspecialties are treated separately. Extensive bibliographies and name and subject indices are included. The enlarged and improved second edition has not been reprinted.

F. H. Garrison, *An Introduction to the History of Medicine*, 4th ed. (Philadelphia, 1929).

The standard English language text for the past 50 years. A chronologically

arranged compendium of names and facts in all areas of medical history. The emphasis is biographical; there are numerous bibliographic footnotes to original sources. Comprehensive up to the beginning of this century, it is better consulted than read. Two valuable features are an extensive list of secondary sources for the history of medicine (to 1929), and an 80 page chronological table of important events. Numerous portraits and name and subject indices are included.

F. W. Packard, *History of Medicine in the United States*, 2nd ed. (New York: Hoeber, 1931. O.P.; reprint ed., New York: Hafner, 1963).

The most comprehensive history of American medicine from the period of colonization to the middle of the nineteenth century. Particularly well covered are colonial epidemics, the early medical schools, and medicine in the Revolution. The emphasis is biographical. Many portraits are included. Included are an extensive bibliography of the history of American medicine, and name and subject indices.

COLLECTED MEDICAL BIOGRAPHIES

Dictionary of Scientific Biography, 15 vols. (New York: Scribners, 1970-1978).

Although the majority of the entries relate to the non-biological sciences, there are several hundred biographies of physicians and bio-medical scientists. It is the definitive work of its kind. Each biographical sketch has been written by an individual who has special interest in the subject. Most biographies are one to four pages long and are complemented by lists of the author's most important works and secondary material relating to him. All periods and geographical origins are included. The work is arranged alphabetically in 14 volumes. Volume 15 is a supplement of topical essays. Other supplements are planned.

H. A. Kelly and W. L. Burrage, *Dictionary of American Medical Biography, Lives of Eminent Physicians of the United States and Canada from the Earliest Times* (New York: Appleton, 1928. O.P.; reprint ed., Kennebunkport, Maine: Milford House, 1971).

This work, containing more than 2000 alphabetically arranged biographical sketches, is the most useful single source for information about American physicians. The biographies, each about a page long, contain limited personal and professional biographical data. No illustrations. A useful bibliography of biographical sources is included.

J. H. Talbott, *A Biographical History of Medicine — Excerpts and Essays of the Men and Their Work* (New York, 1970).

The book is arranged chronologically; contains several hundred brief (one or two page) biographies and short excerpts from important publications. The majority are British and American physicians who practiced after 1800. Bibliographical footnotes and name and subject indices are included.

BIBLIOGRAPHIES OF THE HISTORY OF MEDICINE

L. T. Morton, ***A Medical Bibliography (Garrison and Morton) — An Annotated Checklist of Texts Illustrating the History of Medicine.*** 3rd ed., (Philadelphia, 1970).

A standard reference which cites more than 7,500 of the most significant books and papers in the history of medicine. Citations are arranged chronologically within each subject and include publication information. Although this book is primarily a list of original contributions, it contains important sections dealing with secondary material on many aspects of medical history, medical bibliography, and collected medical biography. Name and subject indices.

Index-Catalogue of the Library of the Surgeon General's Office (Washington, 1880-1961). [The *Index-Catalogue* is comprised of five series consisting of 16, 21, 10, 11 and 3 volumes.] O.P. reprint ed., Chicago: Johnson, 1972.

Begun by John Shaw Billings, this catalogue lists about three million books and pamphlets in the National Library of Medicine. The work is arranged alphabetically; author and subject headings are included in a single listing. It is an invaluable aid to historical research in medicine, being more comprehensive than any other bibliography of medicine.

E. C. Kelly, ***Encyclopedia of Medical Sources*** (Baltimore, 1948 O.P.; reprint ed., Huntington, N.Y.: Krieger).

An alphabetical list of eponyms with bibliographical information for the location of the original report. Little known contributions as well as classics are included, and more than 15,000 citations for 5,000 individuals are listed. Especially valuable for British and American contributions since 1800. An index of diseases, operations and techniques is included.

LOGISTICS OF BOOK BUYING

American Book Prices Current (New York: American Book Prices Current.) Published yearly with cumulative indices published every five years [1970-1975 most recent].

An alphabetically arranged list of books sold at auction that includes some medical material. It is most useful for estimating the value of significant medical books which are common enough to appear on the market with some frequency. The fluctuations in price reflect the peculiarities of purchasing books at auction.

Bookdealers in North America — A Directory of Dealers in Secondhand and Antiquarian Books in Canada and the United States of America 1976-1978, 8th ed. (London: Sheppard Press, 1979).

Bookdealers are listed geographically with indices arranged by name and specialty. Most entries include a brief description of the nature of the business (shop or mail order, year founded, etc.) in addition to details of location. Sheppard Press also publishes similar directories of bookdealers in Great Britain and Western Europe.

D. McGrath, ***Bookman's Price Index,*** 17 vols. (Detroit, 1964-1979).

An alphabetical listing of books that have been offered for sale by major antiquarian bookdealers in their catalogues. Several dealers who specialize in medical books are regularly included. The prices cited are those listed in the booksellers' catalogues and do not necessarily mean that the book was sold at that price.

CARE OF BOOKS

C. Horton, ***Cleaning and Preserving Bindings and Related Materials,*** 2nd ed., (Chicago: American Library Association, 1969).

The book is intended primarily for institutional libraries; however, it contains much valuable information for the individual collector. Methods of restoring and preserving books and related material are discussed. A brief glossary of terms relating to the care of books is included, along with list of suppliers of the materials discussed in the text.

LETTER TO THE EDITOR

A Reply to Miller's "The Habit of Sherlock Holmes"

Dear Sir,

Dr. William H. Miller recently published in the previous series of this journal the article "The Habit of Sherlock Holmes."[1] In that article Miller proposed that Sherlock Holmes did not inject cocaine as Dr. Watson reported, but that he probably injected a belladonna alkaloid instead. The purpose of this letter is to refute that contention.

First, all of Miller's evidence for his position is out of date (the most recent reference source having been published in 1968) and basically continues to propagate the misstatements about cocaine that persist of this day. For example, many of the authorities Miller cites view the user of cocaine as criminally inspired, unreliable, unable to attend to ordinary duties of life, morally debased, and psychotic or neurotic. Because Holmes was none of these, Miller concludes that Holmes must not have used cocaine. Although certain persons, particularly with extensive use of large doses, may exhibit these characteristics, this is not inevitable. Further, studies attempting to relate drug use with various forms of deviancy have been unsound methodologically, and many beliefs about drug users based on those studies are wrong.[2] For example, it is often the case that differences between drug users and non-users exist before the use of drugs begins.

Miller also asserts that "No one uses cocaine occasionally," implying that the use of cocaine inevitably becomes habitual, so that Watson's characterization of Holmes as an occasional user could not be correct. There is much evidence to suggest otherwise. As Walter Modell of the Department of Pharmacology of Cornell University Medical College points out, "although habit-forming, cocaine is not tenaciously so, and, since it is not physiologically addictive, strong personalities like Freud and Sherlock Holmes had no trouble in controlling the habit."[3]

Curiously, Miller uses Goodman and Gilman's classical pharmacological textbook (*The Pharmacological Basis of Therapeutics*) to support his position; however, he cites the first edition, published in 1941, in which it was noted that

---

1. W. H. Miller, "The Habit of Sherlock Holmes," *Transactions & Studies of the College of Physicians of Philadelphia,* Fourth Series, 45(1978):252-257.

2. J. A. O'Donnell, "Variables Affecting Drug Use," *Science* 203(1979):739-740.

3. W. Modell, "Mass Drug Catastrophes and the Roles of Science and Technology," *Science* 156(1967):346-351.

"the cocaine addict is not a normal individual but is often a dangerous and debased person." Clearly, this belief was not held by the majority of pharmacologists 24 years later, as we find in the most recent edition (1975) the following statements, none of which support Miller's remarks, about cocaine and other psychostimulants:

> The chewing of coca leaves is still common among the Peruvian Indians of the Andes. However, in the latter setting neither the intense preoccupation with drug use nor drug toxicity seems to occur... In short, while it is commonly assumed that the subjective effects of cocaine are more intense and its abuse potential more significant than those of the amphetamines, reliable evidence for this assumption is difficult to obtain..."[4]
>
> Perhaps it is the capacity of so many normal individuals to experience the drug-induced mood elevation without becoming compulsive users that made it difficult fully to appreciate the abuse potential of the amphetamine-like drugs.[5]
>
> Some individuals seem to use the drug [CNS sympathomimetics] for months or years without developing a toxic paranoid syndrome, yet such symptoms can develop in the course of a single "run."[6]
>
> Sir Arthur Conan Doyle's famous Sherlock Holmes took advantage of the central effects of cocaine, much to the perturbation of Dr. Watson.[7]

Miller attempts to support his arguments additionally by assuming that Holmes' use of cocaine "three times a day for many months," which Dr. Watson notes in "The Sign of Four," constitutes long-term usage which should result in the classic symptoms of psychostimulant abuse which resemble those of paranoid schizophrenia. Since Holmes did not exhibit these symptoms, Miller assumes that Holmes was not injecting cocaine. However, these are insufficient facts upon which to draw influence. We know only that Holmes had said that a 7% cocaine solution was used. We have no evidence as to the total quantity of cocaine used on each occasion, a critical piece of information for determining the effects of cocaine and other psychostimulants.[8]

One can see the futility of trying to establish anything about what cocaine would do without this information, by making a similar statement, about the effects of a 12% solution of alcohol taken three times a day. If the solution happens to involve a glass of wine before lunch, dinner, and bedtime for several months, we would not generally assume that the person has a drinking problem, nor would we expect to see any particularly notable effects. If, however, one partakes of a fifth of a gallon of wine in the morning, at noon, and at night, daily

---

4. L. Goodman and A. Gilman, *The Pharmacological Basis of Therapeutics*, 5th ed. (New York, 1975) p. 302.

5. *Ibid.*, p. 302.

6. *Ibid.*, p. 304.

7. *Ibid.*, p. 387.

8. R. B. Resnick, R. S. Kestenbaum, and L. K. Schwartz, "Acute Systemic Effects of Cocaine in Man: A Controlled Study by Intranasal and Intravenous Routes," *Science* 195(1977):696-698.

for several months, alcoholism certainly must be considered. Furthermore, the short duration (30-60 minutes when administered intravenously) of the actions of cocaine[9,10] would indicate that Holmes was under its influence for only a few hours a day. Unless Holmes injected cocaine in the 50-200 milligram range, we probably would not read of the more notorious effects. If Holmes did use cocaine in these quantities, the immediate effects observed by Dr. Watson would not have been as subtle as those that he described in "The Sign of Four."

Miller's evidence that Holmes injected a derivative of belladonna rather than cocaine is equally weak. First, he notes that the British Pharmacopoeia of 1885 does not list cocaine as suitable for injection. In all likelihood this was because cocaine was still considered an experimental drug at that time. But we know that several investigators, e.g., Freud, did use subcutaneous injections of cocaine even before 1885.[11] Holmes himself was interested in experimental pharmacology and no doubt had the capabilities for preparing cocaine injections.

Of the four drugs supposedly suitable for injection at the time, morphine, atropine, ergotine, and quinine, only atropine (or some other belladonna alkaloid) was not ruled out by Miller as a substitute for cocaine. These were also drugs with which Holmes was quite familiar. Miller proposed that Holmes might have used a belladonna alkaloid as a sedative and tranquilizer when he was between cases. An alcoholic beverage would have served these purposes well without the more dangerous injection method of administration. Further, the alkaloids of belladonna are not especially good sedatives, since they have other properties which may be particularly unpleasant to the user. Among these are: 1) increased heart rate; 2) dryness of mouth and nose; 3) dilatation of the pupils (which makes the person very light-sensitive); 4) decreased sweating; 5) constipation; 6) thirst; 7) dysuria; 8) increased temperature; 9) blurred vision; 10) confusion, slurred speech, disorientation; and 11) drowsiness and fatigue. With larger doses psychotic behavior and hallucinations may occur.[12] None of these effects are very attractive, and it is perhaps for this reason that these drugs

9. D. M. Grilly, "Rate-dependent Effects of Amphetamine Resulting from Behavioral Competition," *Biobehavioral Reviews* 1(1977):87-93.

10. J. I. Javaid, M. W. Fischman, C. R. Schuster, H. Dekirmenjian, and J. M. Davis, "Cocaine Plasma Concentration: Relation to Physiological and Subjective Effects in Humans," *Science* 202(1978):222-228.

11. S. Freud, "Uber Coca," *Zentbl. Ther.* 2(1884):289-314.

12. Goodman and Gilman, *Pharmacological Basis of Therapeutics*, p. 522.

are not now abused to any great extent. Nor do these seem to be effects which Holmes, as an advocate of clear thinking, would enjoy. Should a case have presented itself while he was under the influence of a belladonna alkaloid, Holmes would have had difficulty pursuing it until the effects of the drug had subsided. Under the influence of a small dose of cocaine he would have had no problem in taking up the case immediately.

In summary, the evidence suggests that the depiction by Dr. Watson of Sherlock Holmes' use of cocaine and the effects of it upon him was accurate and consistent with what is presently known about cocaine. To suggest otherwise is to make hypotheses in advance of the facts.

David M. Grilly, Ph.D.
Department of Psychology
Cleveland State University
Cleveland, OH 44115

Memoir of Abraham Cantarow
1901-1979

BENJAMIN HASKELL, M.D.

ABRAHAM Cantarow, M.D., Emeritus Professor of Biochemistry at Jefferson Medical College, died September 1, 1979, after a long and distinguished career.

Doctor Cantarow was born in Hartford, Connecticut, into a large family of physicians — his father, grandfather, two uncles and an aunt. During his undergraduate days at Tufts University he was a serious student of the violin at the New England Conservatory of Music and for a time considered music as a career. With his family background, however, his entry into medicine seemed inevitable. He entered Jefferson Medical College in 1920 and his scholastic ability achieved early recognition. Before the end of the first year he was made a laboratory assistant in biochemistry. At graduation he elected a three-year internship at Jefferson, the first year of which he spent in the Department of Biochemistry. This seemed to lay the ground work for his subsequent career. Upon completion of his internship he was given a teaching appointment in medicine during which he began intensive investigations into calcium metabolism. The research resulted in the publication of a monograph on calcium, the first to be written on the subject.

In 1932, Doctor Cantarow married Elizabeth Stern, a member of an old and distinguished Philadelphia family. They had one daughter, Ellen, now a charming newspaper reporter and free-lance writer living in Cambridge, Massachusetts.

He was appointed Professor and Chairman of the Department of Biochemistry in 1945. Here he carried on pioneer investigations in liver metabolism and liver carcinogenesis. This work, together with his studies on steroid metabolism, laid the foundation for some of the current uses of chemotherapy. His text book, *Biochemistry*, written in collaboration with Doctor Bernard Schepartz in 1954, was used in nearly half of the medical schools in this country and Canada. A smaller text — *Clinical Biochemistry* — was translated into five languages, including Japanese. In 1954, he joined Doctor Abraham Rakoff and the late Doctor Karl Paschkis in the publication of a text entitled *Clinical Endocrinology*.

Doctor Cantarow was close to his students who considered him a friend as well as a highly revered teacher. On two occasions they dedicated their yearbook to him and in 1960 had his portrait painted for the Jefferson Medical College. When speaking of the deep pleasure a teacher experiences, he said, "It is as if one were able to lead a group of eager and alert companions to the high point of a mountain and to reveal to them, in their fresh enthusiasm, the wonders of the scene before them."

In 1963, the University of Helsinki requested his aid, as a member of a three-man international committee, in the re-organization of the Department of Chemistry and Physiology and in the selection of a new chairman. For this, the University presented to him its handsome silver medal. His fraternity presented to him its gold medal of achievement, thus placing him among some of the best known figures in American medicine. He was president of the Alumni Association of Jefferson Medical College in 1964 and in 1968 he received their Alumni Achievement Award. Thomas Jefferson University conferred an Honorary Degree of Doctor of Science upon him in 1969 and in 1970 he was elected an Alumni Trustee.

Following his retirement from Jefferson Medical College in 1966, a special appointment was given to him by the National Cancer Institute — Associate Chief of Program Analysis. Subsequently, he became Chief of their Formulation and Technical Administration branch and he continued in this work until his last illness.

Doctor Cantarow's scientific contributions are well known, but he will be remembered equally for his personal qualities. He spent much time and effort helping graduates to get a proper start in research, an invaluable aid to young careers. His sense of humor was famous and his fund of knowledge broad and precise. He possessed great integrity and stood firm for those principles in which he believed. His warm friendship and sage counsel will be missed by all who knew him.

Memoir of John Bernard Flick
1893-1979

ORVILLE C. KING, M.D.*

JOHN Bernard Flick Sr., a member of the College of Physicians of Philadelphia for over fifty years, died on February 18, 1979. Dr. Flick was one of the pioneers in thoracic surgery as well as an able and respected general surgeon.

John B. Flick was born in Philadelphia on January 15, 1893. He attended local schools and colleges before entering Jefferson Medical College from which he received his Doctorate in 1913. Following this, John worked at the Whitehaven Sanitorium until February 1914 when he interned at the Pennsylvania Hospital. During the summer of 1914 he volunteered for the American Ambulance Service and was stationed at Neuilly-sur-Seine. He was with the British Medical Corps, later joining the U.S. Army, commissioned a first lieutenant in the Medical Corps in France until his discharge from the Army on April 23, 1919. During part of his war service in Europe he was on detached service with a British General Hospital as well as the British Tank Corps and Surgeon on the 23rd Surgeon Team.

The major part of his surgical career was centered in the Pennsylvania and Bryn Mawr Hospitals. At the Pennsylvania Hospital he became Chief of the Division of Surgery from 1946 until 1953. He was President of the Staff in 1953. A similar pattern followed at the Bryn Mawr Hospital from 1922 until 1952, where he later became the Chief Surgeon.

Dr. Flick was an excellent teacher — meticulous and learned. These characteristics resulted in his being an assistant, associate and clinical Professor of Surgery until 1946. This was followed by his appointment as Professor of Clinical Surgery at the Medical School of the University of Pennsylvania and its Graduate School of Medicine until 1953.

He was a member of numerous medical and surgical societies including the American Surgical Association, the American Association of Thoracic Surgery, the Halstead Society, the Society for Clinical Surgery, the American College of Surgeons, the Philadelphia Academy of Surgery of which he was President, as well as of the Thoracic Society. Dr. Flick was a member of the Founders Group of both the American Board of Surgery and the American Board of Thoracic Surgery. Following his retirement from surgical practice he served as Secretary-Treasurer of the American Board of Surgery from 1952 until 1963. He was the author or co-author of 40 or more surgical papers on various surgical subjects.

---

*This memoir would not have been complete if it had not been for the assistance of Dr. Austin Smith.

The majority were in the field of thoracic surgery in which he was an outstanding pioneer.

Again during World War II, Dr. Flick served in the Army of the U.S. from August 1942 until January 1946, attaining the rank of colonel. As a surgical consultant to the 9th Service Command and later, on Guam, he received both the Bronze Star and the Legion of Merit. Here, again he proved to be a "surgeon of extra-ordinary capabilities in his field and was a large measure responsible for the high standards in surgical service in hospitals throughout his command."

Dr. John Flick, a true friend and compatriot is survived by his son, Dr. John B. Flick, Jr., two daughters, Mrs. Ardis Parrott and Mrs. Edward Garrison, and one sister, Mrs. Mary Hughes.

Two Valuable Journals

. . . and dozens of invaluable services!

We do many things to help you in virtually every area of Medical Communications . . . even help to start your own journal.

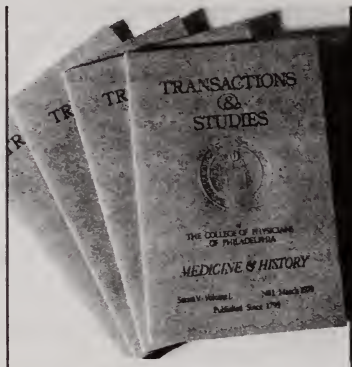
Call us.

☐ SDI Service—Approximately 3,000 titles in all languages.
☐ Data extraction ☐ Literature analysis ☐ In-depth indexing
☐ Retrospective Literature Searches
☐ Reference service ☐ Photocopy service ☐ Telecopier facsimile document delivery
☐ Abstracts—From all languages
☐ Translations—From all languages
☐ Write, edit, abstract, document, typeset, print, bind, collate—for seminars, medical papers, textbooks, research projects.
☐ Prepare and publish journals
☐ Data processing, Computer programming, On-line search services

Special attention is given requests for fast service!

Medical Documentation Service

The College of Physicians of Philadelphia,
19 South 22nd Street,
Philadelphia, PA 19103
(215) 563-1238
Alberta D. Berton, Director



Historic journal in New Series!

Transactions and Studies

of The College of Physicians of Philadelphia,
SERIES V

One of the country's oldest medical journals has now become a quarterly journal of Medicine and History. It will contain, in a new, more readable format, papers on historical topics of medical interest, as well as appropriate clinical papers, in the belief that a thoughtful study of the past can offer insight into contemporary medical and related issues. The first issue included subjects as diverse as patent medicines for children and the medical analysis made from contemporary records of the death of an 18th century London watchman after a quarrel with a fellow. Editor of the new series is Ronald F. Kotrc, Ph.D., and Saul Jarcho, M.D., former editor of the Bulletin of the New York Academy of Medicine, is Consulting Editor in Chief.

Published 4 times a year, subscriptions $24.00, foreign $28.00. Single issues $7.50.

The most complete work of its type—almost 6000 citations of articles!

The Prostaglandins

Bibliography
SUPPLEMENT 3, 1978

One of the fastest growing subjects in experimental medicine! This year's supplement, the third of an annual series, covers almost 6000 citations of articles which appeared in the 1978 literature from major U.S. or foreign sources on every aspect of the mushrooming, important area of prostaglandins. Co-edited by Dr. James Powell, Jr., the Upjohn Co., and Alberta D. Berton, Medical Documentation Service. Citations are alphabetized by author. $29.50 in the U.S.A., $33.50 in other countries. Air mail additional.

TRANSACTIONS & STUDIES

of
THE COLLEGE OF PHYSICIANS
OF PHILADELPHIA

MEDICINE & HISTORY

Series V · Volume I No 4 · December 1979

Published Since 1793